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In the service of our country

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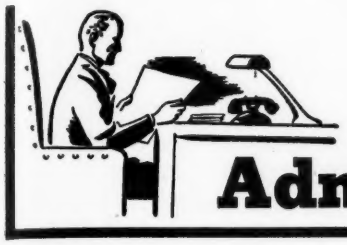


Administrative Highlights •

J. D. Gill Outlines View on Price Increase

To Members of the Petroleum Industry War Council.

RE: Crude Price Increase Recommendation.

Every oil man, trade association and oil trade periodical, that is sufficiently interested and informed, can assist in resolving the perplexing problem presented by Mr. Prentiss Brown's denial of Secretary Ickes' recommendation for an average increase in crude oil prices of 35c per barrel.

Some of the issues are set forth in the following notes on the subject matter of Mr. Brown's denial letter of May 1st to Mr. Ickes.

1. In the second paragraph of his letter, Mr. Brown states:

> "The problems of crude oil prices and their far-reaching effects are not a new development for us."

We assume that he means specifically far-reaching effects of crude oil price increases. What we really need to know about this is what harm will come to our economy if crude oil prices are not increased promptly as recommended by Secretary Ickes.

2. In the second numbered item of the fourth paragraph of his letter, Mr. Brown states:

> "Specific relief may be given to producers where stripper or repressure operations make present production unprofitable."

Undoubtedly what he means is that specific relief should be given to producers conducting stripper or repressuring operations unprofitably. This is a tacit admission that some operations are unprofitable and should be accorded relief. The method of providing the relief is in question.

3. The numbered item 3 of the same paragraph (page 1) reads:

> "That increased incentives may be extended to promote exploration for oil."

Here again is a tacit admission that present incentives are inadequate. Again the issue is of method and not of need. The need appears to have been established.

4. In the seventh paragraph of his letter, Mr. Brown recorded this belief:

> "It is my opinion that price is not the most important factor in this situation at the present time. Consequently, I do not believe that price should be used to correct conditions for which effects are so nebulous and indirect as to remain purely conjectural. In time of war there are more direct means by which positive results can and should be accomplished.

It should be shown that this statement reflects a profound ignorance of the way in which price operates to stimulate the search for and development of crude oil reserves. It should be shown that the effects of an economic increase in the price of crude oil are in no sense nebulous as Mr. Brown states. Also it should be shown that price is a very important factor, perhaps the most important factor, in the slowing down of (not the effort but) the actual rate of discoveries.

It should be shown that the industry has willingly used for exploratory work those resources ordinarily available for this purpose and provided out of the receipts for sales. But the need for expenditures in this connection has outdistanced the resources.

5. Wildcatting is specifically treated in the eighth paragraph of Mr. Brown's letter. Therein he states:

> "Information provided by your office indicates that such (exploratory) drilling is going forward at a rate approximately the same as last year, when the greatest number of wildcat wells in six years was drilled."

Actually the number of wildcat wells drilled in 1942 was not quite equal to the number drilled in 1941, but the difference makes so small a point as to be inconsequential here. Rather we are disconcerted by this statement from Mr. Brown, because it indicates a profound lack of comprehension of the fact that because of the continued depletion of the petroleum resource, the discovery of reserves is becoming increasingly more difficult. No doubt in years to come great pools will be discovered, as was East Texas, by wildcatting methods, and in contradiction to the best geologic opinions regarding the presence of oil in the locality where it is actually found. But here and now, we are thinking in terms of the general laws of chance. Consequently as depletion continues, the difficulty of discovery increases, and more and more effort must be spent to accomplish any measured discovery result.

This is a very important matter. It appears that we must educate the Office of Price Administration with respect to it.

6. In paragraph nine, Mr. Brown mentions other factors than price, all of which the Cost and Price Adjustment Committee detailed in its report, submitted to the War Council in February. Of course, these factors have a bearing upon the problem of discovering and producing crude oil. One of the more important of them, and beyond the control of the personnel of the industry, has been the use of steel. Mr. Brown admits that general limitations have not been placed on the use of steel in wildcat operations, but he persists in expressing the belief that

> "more can be gained by correcting these conditions (manpower, spacing restrictions, restrictive allowables in prorated states, difficulty in material procurement, transportation difficulties, etc.) than can be accomplished through price action."

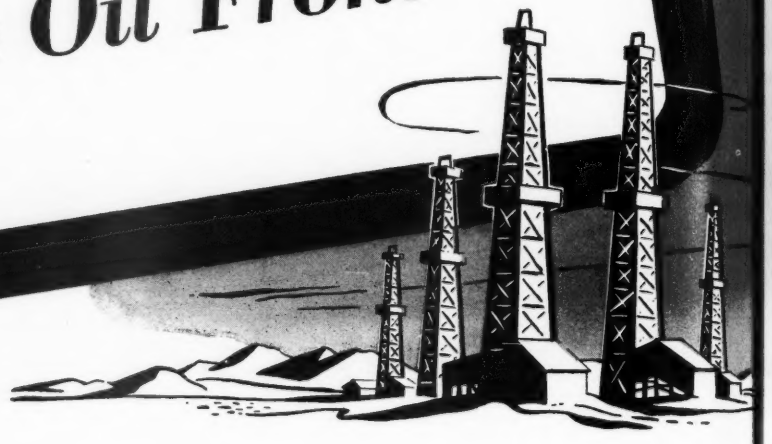
It is the expectation that the industry will be able to show that in this assertion he is wrong, absolutely wrong, so far as the quoted statement applies to the discovery of proved reserves.

7. Throughout OPA's expressed reactions to crude price increase recommendations, and its own proposals for ways of accomplishing the purposes which the industry and PAW believe should be accomplished by a price increase, OPA exhibits an inexcusable ignorance of the way in which economic price operates to promote (through price increase) or retard (through price decrease) wildcatting operations.

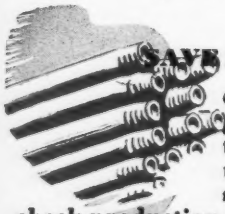
In the tenth paragraph of Mr. Brown's letter, it is stated:

> "One of the arguments advanced in support of a price increase is that it makes funds available which can be used in exploration work. While this is true with respect to companies already owning production, it offers no assistance to the "wildcatter" without such production. It is not my intention that any prospective exploratory well which your office thinks should be drilled should remain undrilled because funds are not available with which to drill it. With

WARTIME STRATEGY
on the Oil Front



WITH today's critical shortages of material and manpower the strategically minded operator is doing *everything* possible to save equipment—save time—eliminate costly operations in the development of his wells. *The peacetime savings effected by Johnston Testers are far more important to the operator and the nation in time of war.* Here's the blue print to follow for an efficient and economical drilling program:

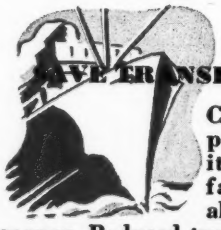


SAVE MATERIALS

Casing programs can be cut to the bone by using the Johnston Tester to check production possibilities of every likely sand *without the need for setting casing.*

SAVE MANPOWER

Formation testing as the well is drilled can cut hundreds of man-hours off drilling time—eliminating extra time spent in setting casing, bailing or swabbing.



SAVE TRANSPORTATION

Casing strings—production items and surface equipment all cost time and money. Reduced transportation facilities make it imperative that equipment requirements be lowered.

The use of the Johnston Formation Tester effects material savings on both domestic and overseas operations. Inquiries on how these savings are made will be welcomed.

FORMATION AND CASING TESTING
THE JOHNSTON TESTER

For the duration, war production at Johnston's must come first. But we're continuing our research and development activities, and at the war's end we'll be able to offer the oil industry even finer and more efficient testing equipment than ever before!

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this in mind, my staff has been working on a plan to meet this need. The plan will make funds available to the "wildcatter" by a method in general use in the industry and without governmental interference in his operations."

Here Mr. Brown shows again OPA's continuous and stagnating fear of windfalls, although he doesn't actually use that term. He cannot see that the wildcatter without production, and, therefore, deriving no funds from a direct increase in price, is supported by other operators who have production, and who would have capital funds provided by an increase, with which to support the wildcatter.

In the quoted statement Mr. Brown apparently accepts the judgment of PAW with respect to the need for drilling exploratory wells. This is noteworthy, and as it should be, because PAW is the governmental agency charged with the study of such matters, and OPA should in no way duplicate PAW's efforts in this matter.

But on the point of how to accomplish the purpose, that is, how to finance the wildcat wells, OPA seems to think that because its special province is price, it knows better how to finance wildcat operations than does PAW. PAW definitely recommended the tried and proven procedure of increasing the price of crude oil. OPA, even in an emergency like the present one, would like to experiment, because it thinks that by experimentation with a method of its own conception, a price increase may be avoided, and the job of wildcatting carried on (not at a lower **real** cost but) at a lower **visible** cost to the people.

Here again there is shown either a deplorable ignorance, or a complete oversight of the expensive processes which must be carried on preparatory to the formulation of a decision to drill an exploratory well. The Price Administrator also exhibits a sublime faith in a totally untried procedure for accomplishing the purposes which have been accomplished heretofore by the method recommended by the Petroleum Administrator for War. It should be shown that the procedure recommended by the latter is eminently practical, and that the proposals of the former are discouragingly impractical.

8. In the twelfth paragraph of his letter, Mr. Brown states, in the concluding sentence, that

"some administration would be necessary"

to carry out the plan which he refers to in general in paragraph eleven, and which he details in paragraph twelve. Of course, some administration will be necessary. Indeed, an overburdening amount of administration would be necessary to cope with the growing complications and the slowing down further and further of the whole process of discovering oil. This should be shown in all of its startling truth. The inevitability of governmental participation in the management of this phase of the business should also be shown, and serious question raised with the statement in paragraph thirteen of Mr. Brown's letter, wherein he promises that his plan

"in no way provides for governmental participation in the management or ownership of the oil business."

It is inconceivable that any agency of the Government would spend scores, or hundreds of millions of dollars without laying down most vigorous regulations for the use of the money.

9. The questionable, nay more, impossible business of handpicking the producers who would be accorded financial relief under OPA's plan is discussed in the fourteenth paragraph of Mr. Brown's letter. Herein he shows again abhorrence for windfalls. Again he implies that some special financing of those stripper wells that are on the verge of abandonment may save them to production, their reserves with them, at a cost much less than that which would result from a general crude price increase. He even makes a statement that:

"If a price increase of 35 cents per barrel is the amount necessary to prevent undue abandonments at this time, it is evident that if it can be restricted to wells that would be abandoned under existing conditions, the cost would be .5% of that resulting from a general price increase."

Here the progress-retarding unfamiliarity of OPA with the whole function of price in petroleum economics, and the utter impracticability of picking out for special treatment stripper wells that are about to be abandoned should be shown in unequivocal terms. It should be shown also that any inadequacy in the price increase method of stimulating search, providing maintenance and rehabilitation of producing properties is a mere matter of degree, and not of principle, and that if a 35 cent increase is not the proper increase, experience in its use will soon show what adjustment should be made in it, and that the adjusted price constitutes adherence to tried and proven experience.

10. In the fifteenth paragraph of his letter, Mr. Brown appears to admit that, at least for certain producing operations, the existing price is uneconomic and unsatisfactory. He states in the opening sentence of this paragraph:

"Prospective secondary recovery projects in areas where existing prices make them uneconomic will be considered on the same basis."

But here again, while admitting some use of price increases for the purpose of stimulating production, he insists in employing a variation of his oil payments plan as applied to wildcat operations.

11. The matter of changes in costs of crude oil production is discussed in the sixteenth paragraph of Mr. Brown's letter. Therein he recites changes in producers' margins from time to time between 1939 and the first half of 1942. He states in part:

"While our studies do indicate that some increase in costs has occurred since 1941, the average margin between net cost and the price of oil in the second quarter of 1942 was in excess of the corresponding amount in 1939 and 1940 . . . the average margin for the year 1939 through the second quarter of 1942 . . . are as follows:

1939	.....25c
1940	.....27c
1941	.....38c
1942	(first half) ...37c"

The inapplicability of these figures to the problem which concerns expenditures on account of future reserves and production should be shown in irrefutable terms.

12. In the eighteenth paragraph of his letter, Mr. Brown undoubtedly refers to the hold-the-line executive directive. In it he states:

"You (Mr. Ickes) do, of course, recognize that the Act of October 2, 1942, and the Executive Order of April 8, 1943, require this Office to use all discretionary powers vested in it by law to prevent further price increases and that the only increases that could be made effective were increases required by law. Although I do not feel that this is the place to discuss all of the implications of this Order, I am not of the opinion that such an increase could be justified thereunder."

It should be shown that the oil industry is deeply sympathetic with the general objectives of avoiding the consequences of wild inflation, but also that it is mindful of the fact that it is even more important that there should be available a plentiful supply of petroleum for the immediate, and all-important purpose of winning the war; and moreover, that increases in price that are necessary to achieve required production are in no sense to be regarded as inflationary.

It should be shown also that Mr. Brown has taken the easier course in rendering a negative decision on the Petroleum Administrator's recommendation, and that had he studied the matter sufficiently, either before or after receipt of the recommendation, he would have minimized some of the legal objections to the proposed increase, would have

abandoned altogether his uneconomic proposals for substitute measures, and would have in the end acquiesced to the proposed price increase as the tried and proven method, which he is willing to accept as valid from the studies of the Petroleum Administrator, namely, to expand and intensify the search for petroleum reserves.

13. Over and over the refusal to consider the role of price in the petroleum economy, and to realize that there is a tie to price, even in their own plan for governmental participation in the financing of wildcat wells, is glaringly obvious in the OPA denial of the PAW recommendation. For example, OPA disregarded the fact that a suitable price for the well when finished was requisite in order to have the well, financed in part by Government money, taken off the wildcatter's hands. Apparently OPA sees only the spending of so much money to drill a wildcat well. It is the fact that the agency has overlooked the tie to price that is undermining the whole proposition.

14. If the price was economic, that is, suited to the need, then the OPA plan would have a better chance of successful administration. But if the price of crude was suitable, then obviously the savings which OPA has estimated from the administration of their plan would not materialize. In short, the override interest loan plan would not be as good as its authors think it is. This subject must be developed in detail.

15. The OPA project assumes there is a much cheaper way of doing the old job than the way which is current, despite the many thousands of minds working on it for many years. If the price of crude oil is not an economic price, that is, a proper price, and if the Government finances wildcatting as proposed by OPA, then the Government would have to continue to finance production all the way, including the financing of development wells and actual production. The role of price must become clear sooner or later. Even if many discoveries were made by the subsidy procedure, or its rough equivalent of a loan procedure, a price increase would be needed to implement production.

16. There is a need to bring into play the thousands of minds of the personnel of the industry who are stimulated more by having extra dollars flow into their hands as the result of a price increase than they are by a contract with the Government.

17. The Prentiss Brown plan would work better if Mr. Brown knew where the prospects were. He could go to the industry's personnel, and tell them to get started, but if he merely says, "We are willing to go along with you if you can tell us what to do," he is going to sit back home waiting for wildcatters to come to him if his plan were adopted. The wildcatters who were said to be the authors of the scheme might be on his doorstep the same day the plan was issued. But we need them to come in droves. We need to get the whole industry organized and thinking about discovery, and the virtue of the loan procedure would not be established because a few wildcatters embraced it.

18. Care must be exercised not to bring individual investors into the business on the strength of the idea that they are in partnership with the Government.

19. The larger companies, as distinguished from the traditional wildcatter, have held off from such exploration as is necessary to find the needed reserves, presumably because of the unsatisfactory degree of profitability of exploration under the existing price structure. Profitability of the enterprise is obviously tied directly to price, a fact which OPA ignores.

20. The alleged savings of the loan program of OPA appears to be based upon the erroneous assumption that the actual cost of finding and producing oil will remain constant. Contrarily, it appears that costs are ascending and the outlook is for higher costs. Higher costs mean higher prices or curtailed production.

21. What role does that part of the increase have that finds its way into the hands of operators who do not use the price increase directly for exploration? That is the factor which confuses OPA, the aspect of the matter which causes OPA to magnify the windfall idea. It must be shown to OPA that price does play an important role, even price that does not find its way immediately into exploration.

22. Here is one of the anomalies of the entire situation. It is a curious thing, the very point on which OPA has indicted the industry repeatedly, namely, on its inability to state that any given price increase would yield a given result in so many additional barrels of reserves—yet in the OPA plan the assumption is obvious that if the Government spends $150,000,000 to drill 4500 wells, enough oil will be discovered to satisfy the need. Perhaps, after all, the cost to do the job by the governmental participation plan will be much greater than anticipated.

23. A price increase makes producers willing to pay more for reserves that cost increasingly more to discover, and to pay more for wells to develop those reserves.

The Cost and Price Adjustment Committee's special crude oil price study subcommittee is actively engaged upon the drafting of statements on the issues recited above. Nevertheless, because of the importance of the matter, and the help which many minds can afford, you are invited to forward a statement expressing your views on any or all the foregoing items.

Very truly yours,
J. D. Gill
Chairman, Committee on Cost & Price Adjustment

c. c. Economic Advisors
Messrs. W. R. Boyd, Jr.
L. J. Logan
E. W. Mayo
Walter C. Monroe
W. C. Platt
C. O. Willson

P-98-b Amended

Preference Rating Order P-98-b was amended May 15th by War Production Board to provide the petroleum industry with an improved method of securing new materials through the Petroleum Administration for War for (1) discovery, development and depletion of oil and gas fields, (2) construction operations, and (3) maintenance, repair and operating supplies. The amended order simplifies and centralizes all controlled materials regulations as they effect the petroleum industry

Operators seeking materials for oil and gas discovery, development and depletion operations are divided into two groups:

1. U. S. operators, who drilled 40,000 feet or more during 1942.
2. All other U. S. operators and Canadian operators.

Approximately 100 operators will fall in the first group and past experiences indicate they will drill one-half of the U. S. 1943 total footage.

To obtain controlled materials, the large U. S. oil producers must submit for approval, Form PD-873 filled out in detail to show the quantity of controlled materials required, at least four months prior to the calendar quarter in which such material is to be delivered. This form must be filed with the PAW District Office for the area in which the material is used. When PD-873 is approved, an allotment number and preference rating will be assigned which may be used on delivery orders without further submission to PAW.

The small U. S. oil producers and the Canadian operators will obtain controlled materials by filing form PD-873 with either the PAW District Office or the Canadian Oil Controller, not less than one month prior to the time material is to be delivered. An allotment number and preference rating will be assigned which

(Continued on Page 32)

The Selection and Application of Internal Combustion Engines

By Jack Graves, Sales Engineer
Petroleum Equipment Co.

May Meeting

Expectation of Industrial Engine Users

The average person today is familiar with an internal combustion engine as a prime mover for his automobile. He talks about his engine power in figures ranging from 75 to 125 horses, but he doesn't visualize the power required by his car as it rolls down the highway. He seldom uses his car more than two hours daily and probably won't travel more than fifty miles in that period.

Fig. 1 represents the loading of the average 1940 automobile engine for level country conditions. This engine has an average rated maximum of 107.9 brake horse power. This was developed at 3580 RPM and 93.9 lbs. brake mean effective pressure. The average compression ratio was 6.41.

At a speed of 25 miles per hour the curve shows a maximum of 45 horse power available. Less than 5 horse power is actually used to overcome the load of the car. Better than nine times the used horse power is available for acceleration and hill climbing. This is very uneconomical on a fuel consumption basis, but the American motorist demands snap and dislikes to shift gears. He also likes to be able to drive 60 to 70 miles per hour and that demands close to 80% of the available horse power.

After traveling from fifty to sixty thousand miles, the average person is not surprised to find that he needs a new set of piston rings and connecting rod bearings. Why, that car has given three years of service, and it is entitled to have some money spent on it.

The plant operator who thinks that his car engine is giving good service under these conditions thinks he has been "taken" if the engines driving his cooling tower pumps need to be re-ringed before three or four times the same hours of operation. Analysis of the total operating hours of an automobile engine under the above conditions reveals that the equivalent plant hours would be approximately three months.

The foregoing was presented to impress the user of industrial engines and power units with the fact that they are getting something extra when they invest in industrial type engines and properly apply them.

It is hoped that the non-users of engines will also be impressed and become converts.

Engine Types Considered

Engines as referred to below are classified as spark ignited, 4 and 6 cylinder, 4 cycle, industrial engines of 100 to 3000 cu. in. displacement using natural gas, gasoline and butane as fuel. A sub-classification for this discussion is arbitrarily made as small, medium and large. Small from 100 to 400 cu. in., medium from 400 to 1000 cu. in., and large from 1000 to 3000 cu. in. of displacement.

The methods and design employed to translate the energy of the burning fuel to horse power will not be discussed. As the title implies the primary object is a discussion of the amount of power that the user can reasonably expect to obtain from engines.

Common Selection Factors

Two terms are used generally and sometimes flagrantly in determining the horse power load that a given size engine can carry. The first is piston speed. This is a mean value expressed in terms of feet per minute of piston travel. The engine stroke in inches multiplied by 2 and divided by 12 gives the feet of piston travel for each revolution of the crankshaft. The product of this figure and the engine R.P.M. gives a rate of feet per minute traveled by the piston at a given engine speed. The second term is brake mean effective pressure, referred to as B.M.E.P., and expressed in terms of pounds per square inch. B.M.E.P. is a theoretical value. It is equivalent to the mean effective pressure resulting only from the horse power taken by the primary driven equipment. It does not include any power consumed within the engine itself due to friction, fan load, or power consuming accessories. To visualize this, think of a frictionless 100 per cent efficient engine with no power consuming accessories; B.M.E.P. would be the constant or mean unit pressure exerted on the piston during the power stroke to deliver a certain rotational force or torque at the end of a power take off shaft. The formula for determining B.M.E.P. is the product of B.H.P. and a constant (792,000) divided by the product of the R.P.M. and cubic inch piston displacement of an engine.

B.H.P.—Bragging Horse Power

Fig. No. 2 shows the maximum horse power available by test from a late design 525 cu. in. stripped industrial engine by actual test at various operating speeds. Stripped means that such power consuming accessories as fan, air cleaner, muffler and generator have been removed from the engine. Here the B.H.P. might well be termed bragging horse power.

According to the curve this engine can be called a 120 H.P. engine. The engine is tested in conformance to rules of the Internal

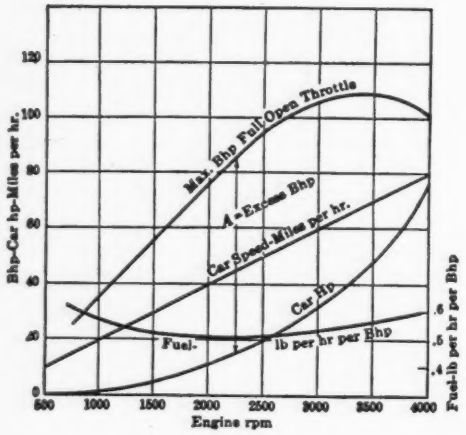

Fig. 1

$$\text{Piston Speed} = \frac{\text{Stroke (in)} \times 2}{12} \times \text{R.P.M.}$$

$$\text{B M E P} = \frac{\text{H.P.} \times 792000}{\text{Displ.}(\text{in}^3) \times \text{R.P.M.}}$$

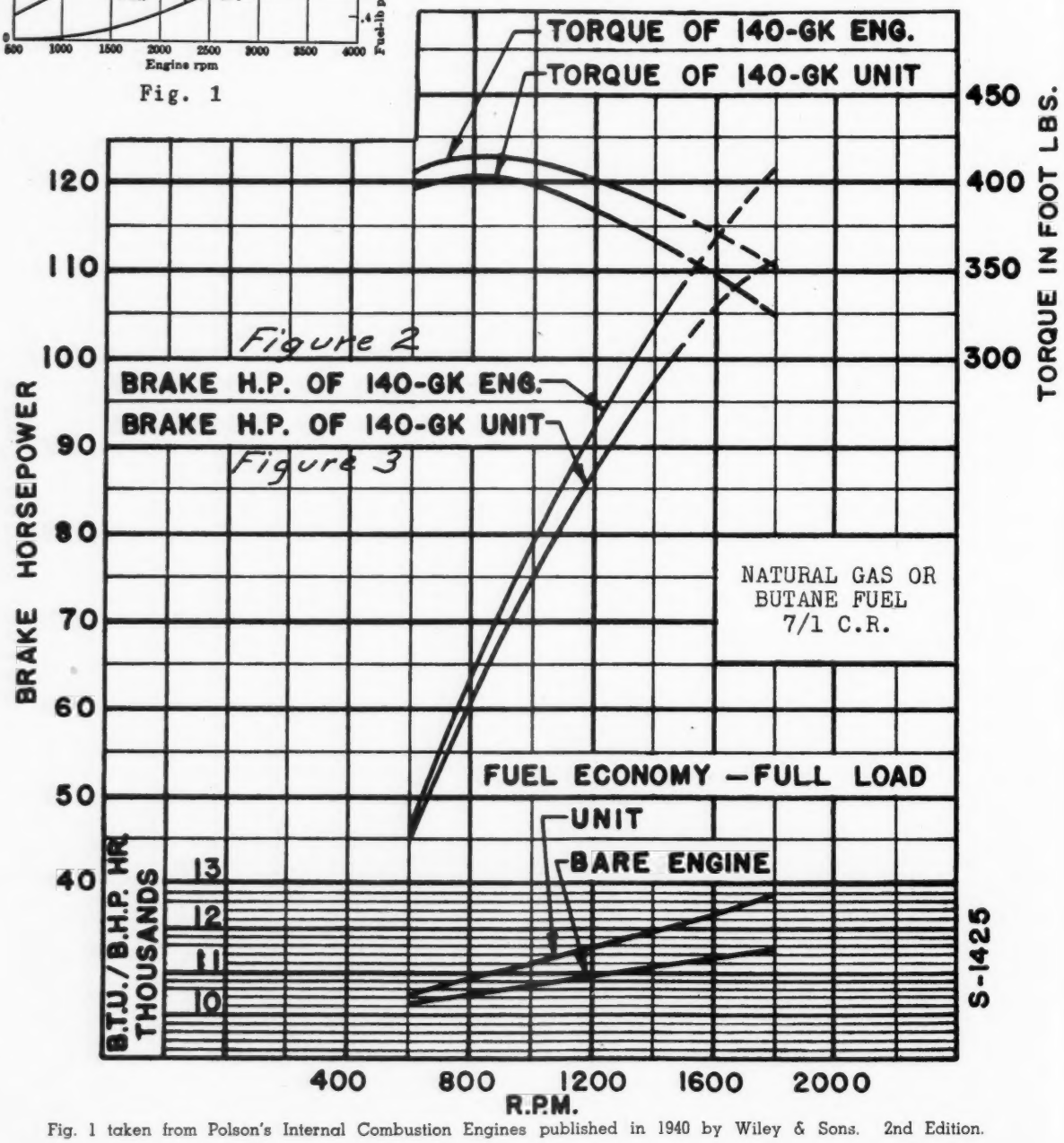

Fig. 1 taken from Polson's Internal Combustion Engines published in 1940 by Wiley & Sons. 2nd Edition.

Combustion Engine Institute. The manufacturer by publishing this curve guarantees that any of his engines of this model will develop 95 per cent of the horse power shown under standard conditions of pressure and temperature.

Fig. No. 3 shows the horse power by test of a complete power unit using the same engine. This horse power maximum has been reduced by the addition of a radiator cooling fan, air cleaner, muffler, and generator. It is as the manufacturer furnishes his standard power unit.

The Internal Combustion Engine Institute rates the load carrying ability of engines and power units as 90 per cent of maximum for intermittent service and 80 per cent of maximum for continuous service. It specifies that these maximums be within the speed limits imposed by the manufacturer for the related service.

Service Classification

Intermittent service is that condition of operation in which the demand for horse power and speed are at a maximum for periods of short duration. These periods are measured in seconds or minutes with longer periods of no load and idling or light loads and lower speeds which might be termed rest periods. Examples of this would be the power demand for hoisting or drag line service. Continuous service is that in which there is a sustained demand for power in periods measured by days and months with no periods of idling. Examples of this are continuously operating electric generators or centrifugal pumps.

Piston Speeds

The piston speed maximums as set by the industrial engine manufacturers for intermittent service will vary from 1200 to 1800 feet per minute and for continuous service will vary from 900 to 1400. There can not be a set piston speed which will be optimum for all engines. Some point must be selected which reflects the engine design. For example, in a small engine of four cylinders as compared to a medium engine of six cylinders: At a given speed the frequency of stress reversals are higher than those of the longer stroke engine. This condition can be more critical than the magnitude of forces from a larger piston and rod at a higher piston speed. The smoother flow of six cylinder power as compared to four cylinder power further modifies the maximum R.P.M. or top piston speed for an engine service.

The petroleum industry has generally limited the piston speed of four cylinder engines to 1000 feet per minute for continuous duty. This has also been applied to medium sized six cylinder engines. There is a tendency with newer models of medium six cylinder engines to allow up to 1200 feet a minute piston speed. With large six cylinder engines it is not uncommon to go to 1300 feet per minute. This higher speed is usually the result of a demand from the driven equipment for a set speed. An example of this would be generator service requiring a synchronous speed of 900 or 1200 R.P.M. for 60 cycle current.

Discussion of Allowable Loading

The general allowed loading of engines for continuous operation has hovered about 60 pounds B. M. E. P. at the operating speed. This figure has been applied in many cases with no consideration to the available power or maximum B. M. E. P. which can be obtained from a given engine or power unit. Standard power unit maximum horse power is obtained at a B.M.E.P. ranging from as low as 70 pounds to over 105 lbs. in the speed range for continuous operation. The average is approximately 90 pounds for all sizes of any manufacturer. The maximum horse power obtainable per cubic inch displacement at a given R.P.M. is in direct proportion to the maximum B.M.E.P. obtainable. An engine with a low maximum B.M.E.P. is more heavily loaded at any set limit than an engine with a high maximum B.M. E.P. Rating engines on a set B. M.E.P. basis assumes that all engines are equal in load carrying ability. The procedure establishes a common level, but unfortunately relegates all designs as equal to the poorest. This system is not an incentive to the engine manufacturer to spend money for research and design improvement.

The tendency in present practice is to modify the maximum **allowable** B.M.E.P. for any one service by a factor reflecting the maximum **obtainable** B.M.E.P. Another way of doing this is to rate an engine or power unit by a percentage of the maximum horse power obtainable at the operating speed. It is reasonable to assume that with higher horse power available per cubic inch the designer has also made provision for getting this extra horse power out of the engine. The American Petroleum Institute in their standardization work has adopted 65 per cent of the maximum brake horse power at the operating speed as a basis of rating oil field pumping engines and power units.

It is suggested that engines and power units for gas or gasoline plants be selected on a basis of 60 per cent of the maximum power at the operating speed for continuous duty service. This is less than the A.P.I. rating for oil well pumping service, but plant service demands can be more severe. In the oil well pumping cycle the load on the engine will vary from 50 per cent to 150 per cent of nominal with corresponding speed variations of 10 per cent to 30 per cent. The load demand in plant service tends more to one speed and sustained load for longer periods.

The rating of engines on a percentage basis is an easy method to use, but care must be exercised that the maximum horse power figure to be factored is truly representative of the engine or power unit as it will be placed in service. Many manufacturers do not publish natural gas performance curves of their engines, but gasoline power curves can be representative.

By proper compression ratios the use of natural gas fuel in an engine can increase power output as much as 25 per cent over that obtainable with 60 octane gasoline. Standard units designed to burn natural gas have compression ratios from 5.5 to as high as 8 to 1, and the natural gas power curve will at least be equal to the gasoline curve.

The I.C.E.I. test curves for complete power units are reliable for engine selection. These curves represent standard units and not some super-duper, custom-built power house with the same bore and stroke as a standard model.

Engine Selection

All the foregoing has been a discussion of the rating of engine power. When engines and power units are to be selected for specific jobs, it is well to keep in mind two important ideas: (1) The engine will produce no more horse power than that required by the driven equipment. Determine for all conditions of service anticipated the demand for horse power. The engine must have this power available at the speeds required. (2) It may be that the load on the engine at some points is not within set limits or that the speed is not within set limits. A compromise at some point may be desirable. As an example, you may want a direct connected, engine driven centrifugal pump and find that the horse power required is too large for an engine. It is too large for this reason: An engine large enough to carry the load can not be operated at the speed required for pump performance. A compromise can be made by use of a speed increaser gear or V belt drive between the driver and the driven pump. The gear will make the most compact installation, but the V belt drive will probably cost less to buy. Another compromise can be made by splitting the job into two or more units so that the allowable engine speed of smaller models will permit direct connected pumps. This will increase the floor space required for the job and the installation and piping cost, but standby cost can be lowered. An installation of engines should be made with standby equipment when failure would cause a whole plant to be shut down. A multiple unit installation can cut the cost of standbys in inversion proportion to the number of units. Three units running and one standing by costs less than one unit running and one standing by. Each of the former would be large enough for one-third of the load demand, and each of the latter for the whole load demand.

It has been a practice to allow increased piston speeds when loads are light and to increase loads when piston speeds are low. There is reason to believe that this deviation from standard is permissable in individual models, but it is not recommended for all models even of one manufacturer. Some models are inherently slow speed sluggers and some are high speed lightweights, but it is not necessarily true that the sluggers will outlast the lightweight in the long stretch.

Engine Applications

Engine applications have had more to do with engine success or failure than any one other item. After going through all the process of rating and selecting an engine for a particular job, it sometimes becomes a source of grief. Most of this grief comes from conditions over which the engine has no control but which control the engine. Accessory equipment weakness and lack of engine care are two obstacles to successful operation. Accessory equipment which is adequate for one service is often inadequate for another. This has shown up in plant operation in the failure of jacket water circulating systems, fuel supply systems, ignition systems, oil filters and air cleaners. These bring on all kinds of engine woe.

Jacket Water Circulation

It has been shown by experience that the effect of jacket water temperature is a definite factor in engine wear. Uniform high temperatures in the order of 175° to 185° F. have been found satisfactory. Higher temperatures than these might be beneficial, but with the standard engine water circulating pump there is a tendency for the water to flash to steam at the pump suction and to form steam pockets in the jackets of the engine. This may cause surging of the water in the system to the extent that a hot spot is developed and suddenly cooled by an inrush of water. Cracked heads and blocks are often traceable to this action. An ideal condition for standard systems of cooling would be 175° F. water to the block and 185° water out or a pick-up of ten degrees. In actual practice the pick up is seldom less than 20° F. and it is often as much as 60° F. This lack of uniform jacket water temperatures cause unequal expansion through the block with resulting excessive wear in these areas. Cylinder bore taper and out of round bores are often indications of this condition.

These conditions can be improved, water rates increased and pick up kept to a minimum if the water pump on the engine is allowed to throw the necessary amount through the engine block. On standard power units with attached full flow radiators this can be done by blanking off the radiator bit by bit until the temperature is reached where the thermostats are wide open. If the temperature is still too low blank off more until the desired maximum is reached. All this can be done automatically by the use of shutters on the radiator which not only cut the effect of the radiator but also decrease the power required to drive the fan.

Fans are available for power units which will permit the full circulation of water at all times through the radiator and block. The fan blade pitch is controlled thermostatically so that only the amount of air is circulated to maintain a maximum temperature. Other power unit radiator systems are equipped with a thermostatically controlled by-pass on the engine water outlet. When

this thermostat is closed the outlet water by-passes the radiator and goes directly to the pump intake. As the water heats above a desired point the by-pass opens and permits some water to go through the radiator. Thus only enough water is cooled to maintain the desired outlet temperature, and the intake water is kept to its highest possible temperature for uniform water through the block.

Engines with cooling system as installed by the user can be engineered for optimum temperatures. The design of the jacket water cooling system can be made so the operating heads are within the limits of the standard engine jacket water pump for the required volume. Sometimes the engine is running so slowly that the standard centrifugal type pump cannot be practically utilized, and a special booster pump may have to be installed. In a plant there often is a line with 150° F. water from the compressors. This can be used to cool the engine, and the jacket water pressure can be kept low by returning this stream to the compressor cooling water surge tanks.

In designing engine cooling systems, trouble in operation can be avoided by using nothing but a closed, vented coil. When the standard engine pump is used for cooling water circulation, use a separate coil for each engine. The former eliminates accumulation of dirt in the engine jackets and the latter eliminates water hogging by one engine and starvation by another.

Fuel Supply

Fuel supply systems are not expensive to install, but the user will often install a central fuel pressure control and run long, low pressure, small diameter lines to a number of engines. This is liable to be a sweet set up for a starved engine and burned valves. Many times, complaints that an engine will not pull the load will resolve into the simple fact that the engine couldn't get enough fuel to burn to develop the required horsepower. If central pressure control is used take the trouble to check the capacity of the lines to the engines. Better still, put a regulator at each engine of sufficient size to pass 15,000 B.T.U. of gas per hour for each hour of the load.

This amount won't be used, but there will not be any scarcity of gas, and regulators are cheap. The ordinary house meter variety will do, and your engine supplier can furnish them as part of a small gas scrubber assembly to go with the engine.

Avoid Ignition Failures

Ignition systems cause most of the maintenance hours put in on an engine. The majority of industrial engines are furnished with a magneto. Periodically check your timing, and check your manufacturers' hand book for the proper advance for the fuel you are using. Also check the plug gaps and keep them as recommended. The best of magnetos will break down eventually and others will last a lot longer if that spark doesn't have so far to go (3000 to 4200)) times every minute. If vapor tight spark plug cables are used, be sure that the magneto cable terminals are on the plug or that contact is actually made at the magneto.

Air Cleaners

Air cleaners are often neglected in selection and operation. A good oil bath type air cleaner with capacity to handle the required volume of air is a very inexpensive accessory. It is hard to evaluate its work, but inspection of cleaners in regions supposedly free from dust will show an accumulation of "guck" from which nothing but harm can come to moving surfaces in contact.

Oil Filter Life

Oil filters as supplied by manufacturers of engines seem inadequate, but that term is relative. An automotive oil filter which has to remove the same kind of material as that on an industrial engine, has a new cartridge about every 10,000 miles. This is equivalent to approximately two and a half weeks of plant time. There are available large filters which accumulate more dirt and sludge before becoming saturated and therefore last longer. The value of oil filters generally is not questioned. The evaluating of various types is a business at which men will argue for hours and is outside the scope of this discussion.

Safety Devices

Two generally used safety devices should be on every engine or power unit. One is a device for shutting down the engine should the water temperature become excessive. The other is for shutting down the engine at low oil pressure in the lubricating system. Both of these interrupt or ground the ignition system, and provision must be made to start the engine with the oil pressure at zero.

Governors

Speed governor of the flyball type come as standard equipment on most power units. These have a usual regulating ability of plus or minus 5 per cent from no load to full load of the unit. Critical speed regulation for such service as A.C. current generation, require special governors. It is not common practice to put overspeed protection on plant engines in addition to the standard governor. Overspeed safety shutdown devices are available if the user requires them. Many operators run their engines on the hand throttle for steady load demands and use the governor as a speed limiting device.

Water Cooled Exhaust Manifold

It is advisable to use water cooled exhaust manifolds on engines operating without a fan. When the cooling effect of the fan blast is removed, exhaust manifolds become hotter than they should. This is dangerous to men working near by and bad burns may occur. A hot manifold can be a fire hazard. The possibility of its being a prime igniter is remote, but fibrous material in contact can be charred and heated to a point of combustion. There is evidence that valve life is lengthened through the elimination of excessive

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heat. The water cooled manifold removes heat from exhaust port areas.

Instruments

Panel board instruments included with plant engines usually contain the following: Jacket water temperature gauge, oil pressure gauge, intake manifold vacuum gauge, tachometer with equivalent motor mile odometer and engine generator ammeter or battery voltmeter. Of these, water temperature gauge, oil pressure gauge and intake manifold pressure gauge give the engine operator his best quick check on the engine's performance. The value of the intake manifold pressure gauge cannot be overrated. A tachometer is very handy to have with the odometer recorder of equivalent motor miles. The motor miles may not be truly representative, but this does afford the operator a means of determining uniform periods for engine maintenance services. It is also good for interval reference in engine records.

Engine Generators

Generators are sometimes eliminated from plant engines, and batteries for starting service are charged as required by means of a trickle charger operating on A.C. light current. This removes an accessory from the engine which requires service attention and is subject to wear. Installations of two or more engines in one building can draw their starting current from one battery and a trickle charge centrally located. Wire can be run from this location to each of the units, or the battery moved on a dolly to each engine for starting. The frequency of starting for plant engines is usually so low that either of these systems is satisfactory.

Elimination of Sub-bases

In direct connection of engines to driven equipment, the clutch power take off can be eliminated when the torque demand at low speeds is negligible. Direct connected centrifugal pumps or electric generators come in this class. This can also be done in speed increased gear drives and V belt drives when the engine starter torque is ample. Most V belt drives use the heavy duty clutch available with the engine. This is the cheapest and most compact method of providing bearings for the V belt side pull, and the standard heavy duty clutches have the bearings to stand up.

In many engine drives a sub frame for the complete unit can be eliminated, and both driver and driven equipment grouted to a foundation. On direct connected equipment this can be done without tedious lining up in the field by use of a Watson Spicer type drive shaft. This will permit considerable height or side misalignment as long as the driver and driven shaft are parallel. The practice of providing slide rails for V belt take up can be eliminated and the driver and driven equipment also grouted in place in V belt drives. The use of idlers for belt take-up is one way. Another is the use of an adjustable length V belt of the Veelos type which has proven satisfactory. Wear on this type of belt is compensated by shortening the belt. Its feature of installation or removal without disturbing shaft bearings is convenient.

Conclusion

There are many ways in which engines can be installed which will be a source of either petty irritation or convenience and satisfaction. When an engine driven pump or other piece of equipment is contemplated in your plant, call in your engine supplier. Tell him the minimum and maximum rates and heads expected and the condition and character of the fluid to be pumped. With these, he can offer a pump and engine driven unit which is matched for the best performance and lowest cost. Of the two pieces of equipment, the engine will probably cost the most, and require the most judgment in its selection. Only by having a knowledge of all pertinent information can an engine be selected and applied in a manner satisfactory to the user.

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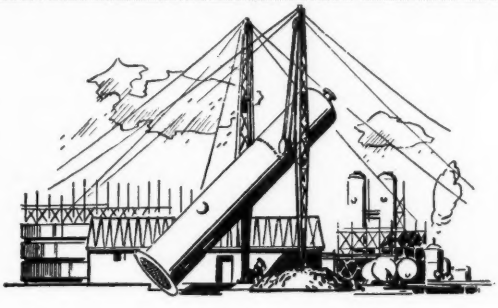

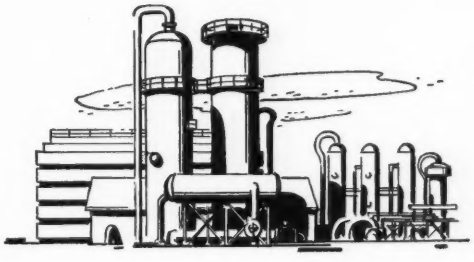

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FLUOR

Newly Expanded Refinery Processes Santa Maria Crude Successfully

In addition to developing a highly successful and profitable refining operation, the Bell Oil & Refining Company has aided materially in the war effort of California by redesigning and expanding its plant near Santa Maria. It had been contended that profitable operation could not be achieved with a refinery charged exclusively with the sulphur-bearing crude of the Santa Maria district and having no outlet except by tank car and truck. The small plant built several years ago and from which the present refinery was developed did have difficulties. But the present management, which took over the refinery operations a little more than two years ago, has met the problems encountered by redesigning the plant to secure greater flexibility of manufacture; by expanding it to make the operation profitable; and by providing for transportation of products by leasing tank cars. The plant is in the midst of the Santa Maria Valley field and an 8-in. pipe line carrying crude from that field to the plant thus provides a very low crude-to-refinery transportation cost.

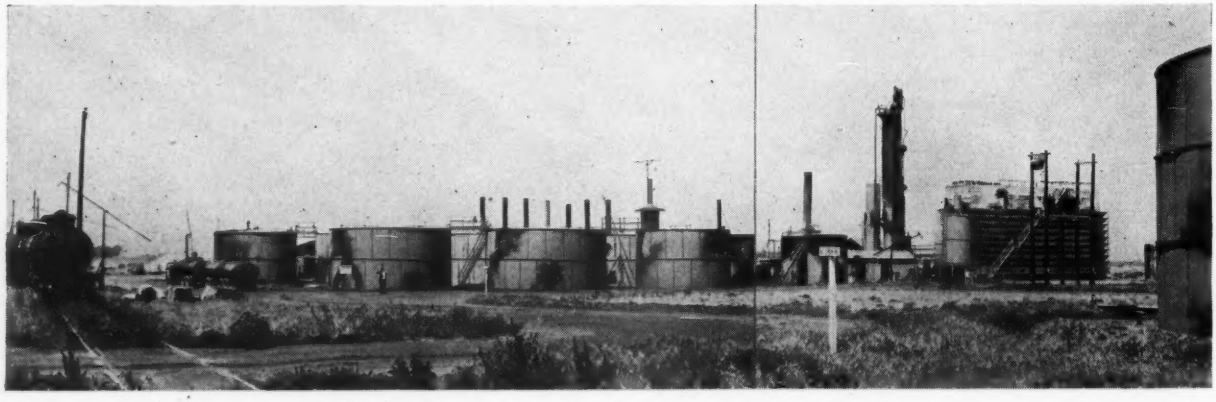
The main product of the refinery during the greater part of the year is road oil and asphalt. An average of 14 per cent of the output, however, is high grade gasoline meeting Army specifications with an octane rating of 80 and above. A considerable amount of fuel oil is also manufactured and the stock below gasoline can be proportioned to fuel oil and asphalt manufacture as the relative demands for these products dictate.

Although the redesign and expansion of the plant were made to meet peace-time requirements, its location has made it of considerable value to the war effort in California. There are a number of army camps in the territory surrounding the location and the gasoline is transported by the company's trucks to these camps. This saves a long haul from more distant refineries and thus reduces transportation, an important factor at the present time. More gasoline than is necessary for this purpose is being manufactured and the remainder is sold to companies distributing motor fuel in the surrounding territory. This also aids in the reduction of transportation since it eliminates that much gasoline which would otherwise have to be brought in from distant points by tank cars or truck. The marketing companies pick up this gasoline at the refinery, using their own trucks for transporting it to their points of distribution.

Present Organization Responsible for Success

The Japanese are indirectly responsible for the formation of the company which is now doing its part in licking Japan. While on a trip around the world several years ago, William F. Lyte (who could not get away from thinking about road oils and asphalt) learned that he could sell the Japanese some road oil for the construction of roads in Manchukuo. Having previously arranged with Jos. H. Gilliland for the supply of heavy oil whenever he might need it, Mr. Lyte cabled Mr. Gilliland to come to Japan. The two there went round and round with the Japanese; but finally closed the deal.

Appreciating each other's abilities these two men became close friends and after returning to the United States they contracted to purchase the entire output of asphalt and fuel oil from a refinery located near Santa Maria, California. It quickly became apparent that the refinery would have difficulty in supplying a sufficient volume of products to meet demands so the owners of the refinery, John C. Black, Paul H. Grimm and other stockholders, asked Mr. Gilliland to take over the management including the operation of the plant. After studying the situation he decided that a re-

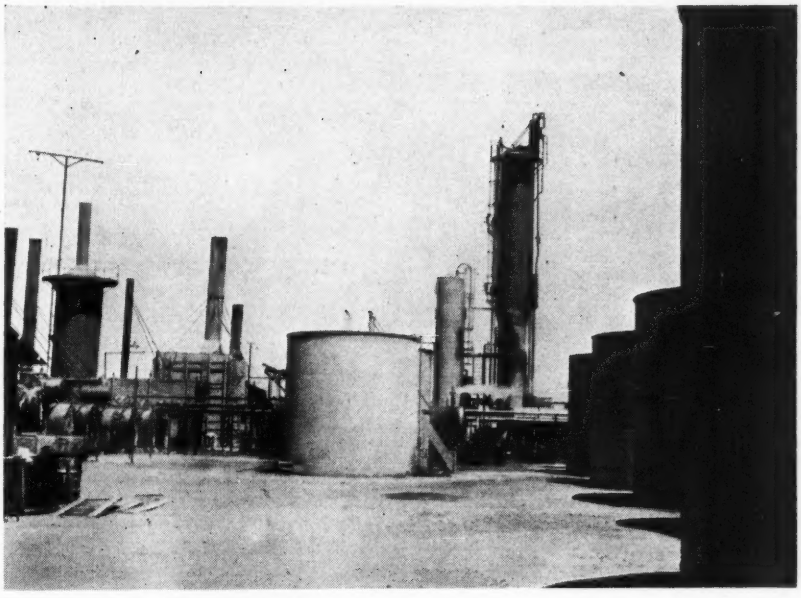


Panoramic view of Bell Oil & Refining Co.'s Santa Maria Valley refinery. Truck and rail loading facilities at left are continually taxed to capacity.

designing and expansion program was necessary and that an operational organization had to be built up so that production could be increased sufficiently to afford an operating profit. The result was the reorganization of the company to include new interests among whom was Alphonzo E. Bell. The name chosen was Bell Oil & Refining Company, since grown into a paying refinery that has just been expanded to process 7000 bbl. of crude oil per day.

The operations of the company are under the direction of Jos. H. Gilliland, president and general manager; the selling of the products is handled by Wm. F. Lyte, vice-president in charge of sales, while L. A. Davis, company treasurer and assistant to both Mr. Gilliland and Mr. Lyte, with headquarters in Santa Maria, holds an important liason position. The plant is operated by Norman F. Tyacke superintendent of the refinery, whose long experience in refining has enabled him to supply the products according to the many specifications demanded. Starting his refining experience with Standard of California, with which company he spent six years, he was on the Richmond and El Segundo process work and later was foreman of the Burton pressure stills. Then, after serving for one year as chief refiner for Marland Refining Co., in Ponca City, Oklahoma, he went with the Mexican Refining Co. of Louisiana, Inc., where he was night superintendent one year and asst. supt. for five years. Next he spent six years with The Texas Company, half that time at the Wilmington, California, refinery and the other half at Lockport, Illinois, being asst. supt. at each plant. Returning to California he was asst. supt. for the Petrol Corp. for three years and then cracking superintendent for Wilshire Oil Co. for five years. He has been general superintendent for the Bell Oil & Refining Company for the past two years.

The shipping of refined products is handled by L. A. Davis, who, after leaving college, was an accountant and statistical engineer for Pan American Petroleum Co. at Watson, California. Following one year as refining accountant for Shell Oil Co. at Watson and five years for Petrol Corp. in Los Angeles, he became treasurer for the Bell Oil & Refining Company and has served in that capacity since the company was organized.



Interior shot of the refinery showing the size and permanence of the installation. This plant is rated at 7,000 bbl. per day.

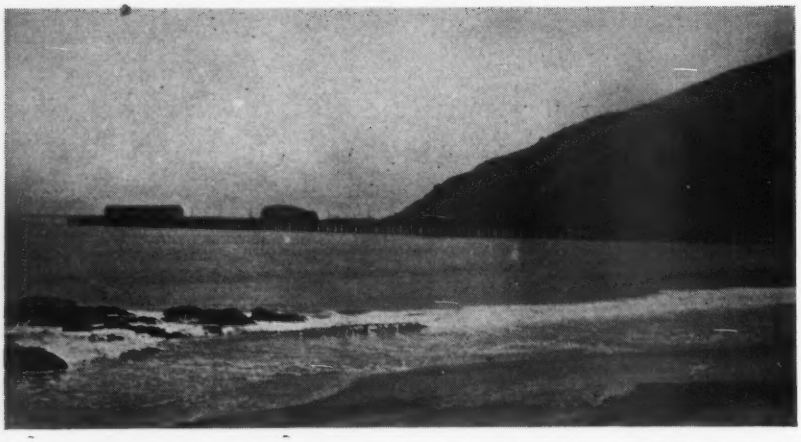
Practically all the men working in the plant are experienced in refinery operations and are not subject to the draft. This factor, combined with a profit-sharing inducement, places the operation in a very stable condition at a time when the manpower situation in the oil industry is serious. The employee relationship is, in fact, excellent. In addition to the profit sharing plan, a 5 per cent bonus of wages earned during the fiscal year ending December 15 is paid to each employee on December 25th.

The Refinery

The capacity of the expanded plant as recently completed is 7000 bbl. per day. Most of the crude is brought in by pipe line from the Santa Maria Valley field. This crude ranges in gravity from 13° to 17° A.P.I. There is, however, a small amount of crude transported by truck from the Lompoc field and this crude, having an average gravity of 20° A.P.I., raises the average through the plant to approximately 15° A.P.I.

The main equipment in the refinery, in addition to pumps, condensers, storage tanks, cooling tower and other auxiliary equipment, consists of a crude pipe still, a viscosity breaking pipe still, an evaporator, two fractionating towers, a stripper and gas separators. The gasoline treating plant includes an acid tower, acid settler, clay tower and caustic tower. The white gasoline is treated in an Ethyl blending plant for producing Ethyl gasoline. Automatic controls are used throughout the refining operations. A testing laboratory has been newly equipped and is capable of running tests on all products.

Since the plant is situated in an extensive valley lying comparatively near the Pacific Coast it has been camouflaged to blend with the predominant features of the surrounding country. The outstanding colors of the topography around the refinery are greens, brown and black; so all buildings, tanks, towers and



Post war marine transportation is assured for this coastal refinery through ownership of the above pictured deep water pier and ocean frontage at Port San Luis.

other equipment have been painted with these colors by the usual camouflaging technique. This work was done by Wilson Bros., an experienced camouflage company, after making a study of the situation. The accompanying photographs indicate the use of the different colors used on the structures but they do not show the two shades of green and the sand-colored brown used in connection with black to blend the plant into the surroundings when viewed from the air.

The products below gasoline are not desulphurized and since the crude is an asphaltic base oil no lubricating oil is produced. The road oil and asphalt is mainly 200-300 penetration and is the residuum from the evaporator into which the crude flows after passing through a crude pipe still. When desired, lower penetration cuts, controlled by temperature in the crude pipe still, are taken. Higher penetration cuts can be taken off direct by heat control or can be made by blending with distillates in storage or by a combination of both methods.

The asphaltic products are made to specifications ranging from road oil to heavy asphalt, including special products such as roofing flux. The asphalt is shipped by tank car mainly to the western states although shipments are made as far east as Texas. At the present time it is being used extensively for the construction of runways at air fields and for the building of military access roads. During the past few months the amount of asphalt manufactured has averaged 12.5 per cent of the total produced in the Western States. Almost all of the shipments are made in tank cars in the service of Bell Oil & Refining Company which, due to its foresight in leasing these cars, has had no difficulties in making shipments. There are approximately 200 of these tank cars in constant use.

Most of the asphalt now being manufactured is the 200-300 penetration grade mentioned above. The storage capacity at the plant for this one product alone is 111,500 barrels; asphalt of lower penetration is placed in separate storage. Asphalt shipments at the present time are furnished to eight specifications but asphalt and road oils can be supplied to meet any demands that are permissible under war-time regulations. Previous to the recent federal regulations, shipments were made to 18 standard specifications and to meet any other specifications requested by the customer.

Fuel oil is manufactured in several grades, the two principal grades being specified as heavy fuel and light fuel. Total fuel oil production averages 1500 bbl. per day. Since it is processed from the sulphur-bearing Santa Maria crude it contains a maximum sulphur content of 5 per cent; but, contrary to earlier conceptions, the fuel has been found highly satisfactory. This is evident from the continual sales in comparatively large volume to railroads and mines in the western states where it is used for generation of steam.

The fuel oil is processed by passing the residuum (which remains after the gasoline, kerosene distillate and gas oil is taken off) through a viscosity breaking still and passing this heated residuum through a fractionating tower to take off cracked naphtha. When desired, if extra distillates are in storage, the residuum is cut back with distillates to manufacture the fuel oil.

All the gas taken off during distillation is utilized for fuel but since this is inadequate for plant operation, from 1.5 to 2.0 million cu. ft. per day has to be purchased.

The tank car loading rack has a capacity of 12 cars per switching so that if there are four switches a day, 48 cars can be loaded during that period. Similar facilities exist for the loading of trucks. Distribution of products is rarely affected by weather because the shipments of asphalt during the winter months are mainly to the warm southern states and to coastal areas where temperatures vary but little and conditions are dry. Year-round operations are further assured because of flexibility in product manufacture and of contracts for fuel oil, roofing flux and low penetration asphalt.

Port Facilities

Through an affiliated company, the Port San Luis Transportation Co., the Bell Oil & Refining Company has access to a pier at Port San Luis which may, after the war, be utilized for water shipments of refined products. These products would be transported by truck to the one pier. The pier is approximately 28 miles from the refinery and, due to the purchase of a railroad that originally served the Santa Maria area and connected with the Port San Luis pier, a right-of-way is available for a pipe line should it later be deemed advisable to construct such a line for the handling

of crude oil from the nearby fields to the pier.

The pier extends into an excellent harbor protected by a breakwater and has moorings for a number of vessels of considerable draft. The far end of the pier is in water deep enough to accommodate any coastwise ships. The transportation company not only owns the pier but also approximately two miles of the beach land from which the pier extends. The water upon which this land fronts is quiet throughout the year because of the protection of the breakwater and this provides excellent anchorage.

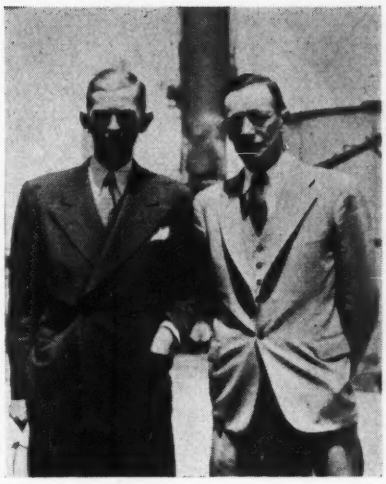
Jos. H. Gilliland

After working in the oil fields and a refinery while attending school at Lawrenceville, Illinois, Mr. Gilliland was employed by Sinclair Oil Co. from 1919 to 1920. Coming to California in 1921 and spending a year with the Union Oil Co. he entered the employ of Alphonzo E. Bell and has been connected with the Bell interests ever since. With the consent of Mr. Bell he has, however, entered into different enterprises of his own. At present, in addition to being vice-president of the Alphonzo E. Bell Corporation, he is president and general manager of Bell Oil & Refining Company; general manager of Santa Fe Pipe Lines Company; general manager of Coast Counties Warehouses Company; general manager of Port San Luis Transportation Company; and general manager of Bel-Air Oil Company. His older son is eighteen and already training in the U. S. Air Corp; his younger son is sixteen and is in military school; while a 12-year-old daughter is active in equestrian circles.

William F. Lyte

Born in Oklahoma, Mr. Lyte started school in Texas, graduated from high school in Oklahoma and then went to the New York School of Fine and Applied Arts in New York City. Having to work his way through high school and college, he attended Austin College at Sherman, Texas, during 1920 and 1921; University of Oklahoma from 1921 to 1923; and Southern Methodist University, 1923 and 1924. After going into the manufacturing business on his own in Texas and Oklahoma he entered the oil industry in 1934, having charge of asphalt sales for Col-Tex Refining Co. and Anderson Prichard Oil Co. of Oklahoma City. In 1937 he moved to Los Angeles and was an independent broker on asphalt materials until becoming vice-president in charge of sales for the Bell Oil & Refining Company.

Oil Workers are War Workers.



Left to right—L. A. Davis, Treasurer; Norman F. Tyacke, Refinery Superintendent.

American tankers carrying lubricants to distant battlefields of the world are doing double transportation duty. They not only carry fuel to keep the bombers flying but they also carry as many as 18 planes lashed to their flat decks. The Army and the Navy were frankly dismayed when they learned that some of their precious planes, almost fully assembled, were hitch-hiking trips on sloshing tankers. They were certain that the seas would sweep over the decks (as they always do) and wreck every one of the bombers. But the ship operators had foreseen that. They had built spindles standing several feet above the deck, lashed down the planes atop the spindles and on the first trip delivered every bomber undamaged. The planes were flying three days later.

Each soldier fighting in foreign countries needs from 5 to 12 tons of shipping space for his equipment immediately upon landing, variables depending on the type of unit to which he is attached. Thereafter he requires an average of two tons of shipping each month.

The expression "tar" to describe a sailor originated from the days when seamen impregnated their clothing with tar to make them waterproof.

YOU can "MAKE" 100 Valves

without using a single pound of steel, setting up a plant, or hiring skilled workmen.

A pound of steel saved is a pound of steel made in these war days, and a valve saved is a valve made, too. That's why we say **you** can "make" 100 valves without using a single pound of steel, without using machinery or skilled workmen needed for other work. Through practicing valve installation, valve removal and valve reinstallation, a feature incorporated in the design of all GRAY Systems of Well Control, a single valve may be removed for use on indeterminable succeeding completions, rather than being left to rust away on the only well on which it was ever used. Valves are unnecessary for the attachment of flow lines to unused outlets, as the use of a removal plug permits the installation of valves as they are needed. Provision for repair and reinstallation is provided if and when valves become worn. Valves and other equipment are accessories with the GRAY Systems of Well Control, which may be used over and over again, removed when not needed, reinstalled when and where needed, and repaired when the necessity arises.

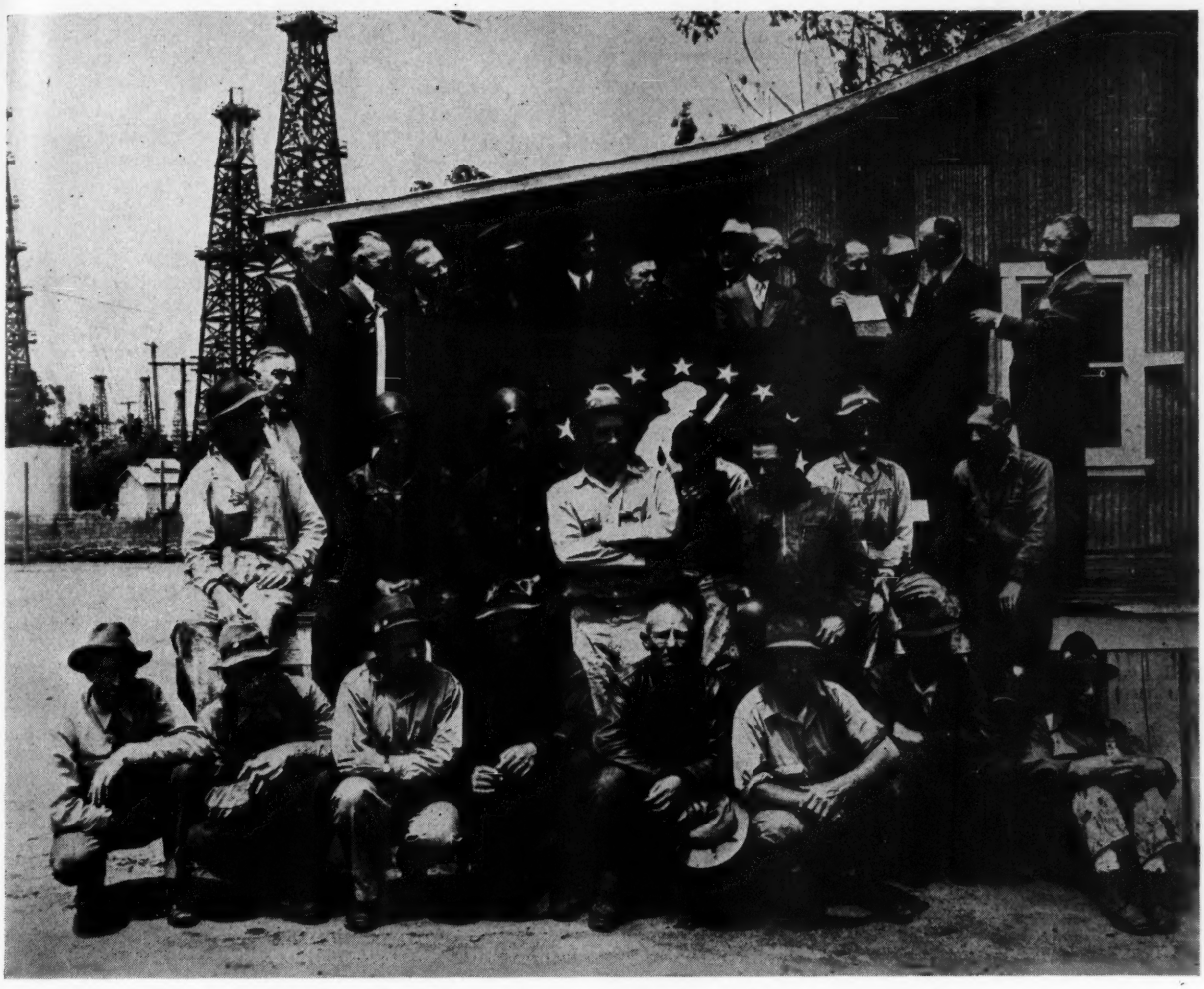
That such savings of control equipment are attainable with safety is evidenced by the successful completion of over 10,000 wells under working pressures up to 6,500 lbs./sq. in.

We invite your inquiry about the complete GRAY Systems of Well Control — our Composite Manifold, valve installation, removal and reinstallation under equalized pressure — how GRAY methods and equipment save steel — how **more strength with less weight** plus **simplification of design** gives **economy in the use of materials** plus **safety in the performance of hazardous operations.**

GRAY
TOOL COMPANY
HOUSTON, TEXAS

West Coast Distributor: WAGNER-MOREHOUSE, INC., Los Angeles

TO SAVE NATURAL RESOURCES AND CRITICAL MATERIALS IN PEACETIME MAKES GOOD BUSINESS SENSE; TO SAVE NATURAL RESOURCES AND VITAL MATERIALS IN WARTIME BECOMES A PATRIOTIC OBLIGATION.



The Production Department at Huntington Beach Being Awarded their "T" Flags.

Bottom row, left to right: B. E. Kays, Claude Huftile, N. A. Nelson, Clark Williams, Bert Planchon, Jack Radford, A. W. Bauer, W. T. Hunter.

Middle row, left to right: J. H. Davis, O. D. Wright, W. Burgess, J. F. Coltrin, R. J. Robertson, O. W. Rider, J. W. Pistole, H. Spafford, G. E. Kesterson.

Top row, left to right: F. A. Boulger, C. R. Curl, Superintendent, J. S. Farquhar, Publisher Huntington Beach News, Capt. M. N. Pheatt, Public Relations Officer, Lieut. W. R. Leach, Public Relations, U. S. Navy, C. R. Furr, City Clerk, Lieut. George V. Caldwell, Intelligence Officer, C. P. Patton, City Judge, W. M. Clegg, City Treasurer, A. L. Henrickson, City Councilman, F. T. Grable Prod, Foreman, Huntington Beach, Dr. Ralph E. Hawes, City Councilman, George J. Wheat, Manager So. Cal. Edison and President of Chamber of Commerce, Representative of Treasurer Dept. of Huntington Beach Dist. William Gallienne, Secretary of Chamber of Commerce.

T.W.A. Oil Co. Awarded "T" Flags

The Production Department of the Los Angeles Basin District, Tide Water Associated Oil Company, was the recipient of three U. S. Treasury Department Minute Man "T" Flags, which was presented to them at the field offices in Los Nietos, Culver City and Huntington Beach, at a colorful and impressive ceremony held under the direction of Roy S. Curl, Superintendent. The Treasury Flags are symbolic of participation by more than 90 per cent of the District's employees in the company's payroll allottment plan for the purchase of War Savings Bonds and Stamps. George Wheat, representing the Treasury Department, War Savings Staff, made the award at Huntington Beach, which was received by Fred T. Grable, on behalf of the employees, and who, for more than 30 years has been affiliated with Tide Water Associated Oil Company.

A portion of the personnel of the Huntington Beach division to whom the awards were made included: Fred T. Grable, F. A. Boulger, O. D. Wright, H. Spafford, E. G. Radford, Clark Williams, O. W. Ricer, C. M. Huftile, N. A. Nelson, J. F. Coltrin, J. M. Lingwood, W. Burges, A. W. Bauer, J. W. Pistole, R. J. Robertson, G. E. Kesterson, J. H. Davis, B. E. Kays, W. T. Hunter, Bert Planchon.

In behalf of the Armed Forces, short talks were made by Captain M. N. Pheatt, U. S. A., Santa Ana Army Air Base; Captain George V. Caldwell, Southern Sector, Western Command, and Lieut. R. W. Leach, U. S. N. Civilian guests included Mayor Tom Talbert, Councilmen

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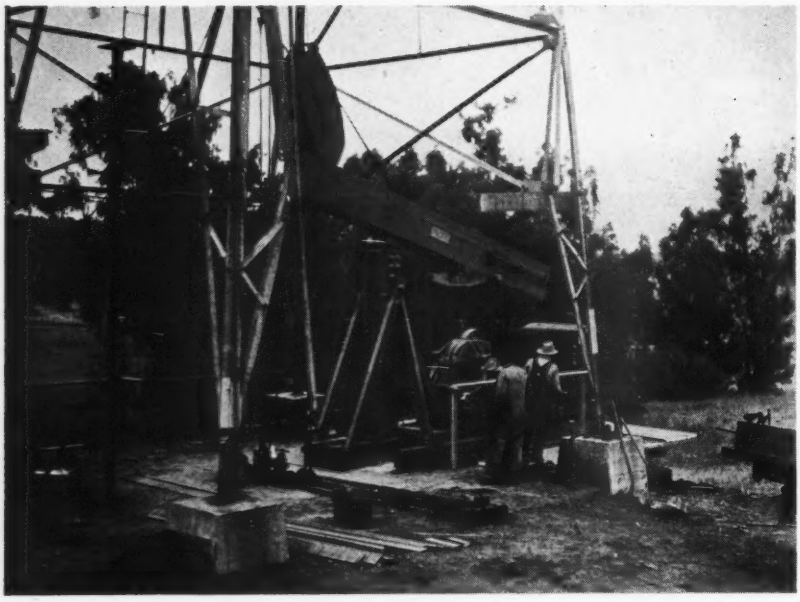


The production crew here is moving in a Pacific Gear Works Series C Timber Portable Pumping Unit on Union Oil Co.'s Hole No. 13 in the East Coyote field. Being rigged while the old long-tail unit is still in operation the new unit represents the latest in war-time manufacturing technique with the walking beam, sampson post and base frame fabricated from Douglas fir timber.

Available here in sizes completely equipped and adapted to all pumping needs the unit is also produced in "stripped" form for the export trade. That is, all wooden parts are omitted in shipment with the consignee to fabricate them from native woods on arrival. This feature permits the transportation of more units without sacrifice of much needed shipping space for other essential export products.

Nomads May Meeting

Mexico, by picture and speech, was the feature of the regular monthly dinner meeting of the Los Angeles Chapter of Nomads held in Los Angeles, Wednesday evening, May 12, 1943. This meeting was preceded by a short business meeting at which four new members were elected. Owing to the press of war work, the sergeant-at-arms, J. V. Robinson, has had to resign his office and Fred Tyler was elected to the office of sergeant-at-arms.

Following dinner, the meeting was opened with the Pledge of Allegiance to the Flag. President Pullman then turned the meeting over to the Master of Ceremonies for the evening, M. E. Montrose. On behalf of the Chapter and as a token of esteem by its members, a gavel was presented to Past President W. F. Bettis, whose work not only as president but also in various other offices from the time of inception of the Nomads has well earned the appreciation of the membership.

Three new members were inducted by Induction Master C. J. McLaren and Master of Ritual M. E. Montrose. These were John F. Dodge and Dan Duncan as regular members and Ralph K. Beall as associate member. Howard H. Harmon could not be present for induction as a regular member because of absence in Canada at the time of the meeting.

After a short intermission for the arrangement of seats, motion pictures (in color) were presented by Walter Wells. These were remarkably fine pictures and gave excellent shots of many places of interest throughout Mexico. The third reel was devoted to the henequen industry of Mexico and the operations of converting henequen into rope were presented in sequence.

The speaker of the evening was Hon. Carlos Grimm, Vice-Consul of Mexico, who spoke on the attitude of Mexico during the war. Unlike during the previous World War, the Mexican people as well as the government, are 100 per cent pro-United States. After dealing most interestingly with the cooperative actions being followed by Mexico and this country and touching briefly on cooperation between all the countries in the Western Hemisphere, Mr. Grimm concluded with the hope that there will be a great advancement in the teaching of Spanish in the United States. The teaching of English is now compulsory in the schools in Mexico and he expressed the belief that the Nomads could be of considerable influence in arousing interest in the learning of Spanish by people in this country.

Among the guests were the following men from other countries: C. A. Lilly of California Arabian Standard Oil Co. from Saudi Arabia; J. C. Russell of Y.P.F. of Bolivia from Bolivia; Harry M. Heath of the Texas Company from Caracus, Venezuela; Dave Dimitt of the International Petroleum Co. from Ecuador; J. A. Pryde of Shell of Colombia from Colombia; E. A. Brown and B. Beck of Caribbean Petroleum from Venezuela.

(Continued from Page 19)

Dr. Ralph E. Hawes and A. L. Hendrickson, City Clerk C. R. Furr, City Judge C. P. Patton, City Treasurer W. M. Clegg, W. H. Gallienne, Chamber of Commerce, Publisher James S. Farquhar, Huntington Beach News.

BUY WAR BONDS

THIS LAUGH

OFF!!

Columnist in The Stars and Stripes, London, hears:

"News flash from the home front: A convention of furniture men has concluded that men returning from the war, having grown accustomed to sleeping alone, will want twin beds. Naive little characters—these furniture men."

"Does your wife do all her own washing?"

"Yeah, All except her back."

A wedding carriage was seen driving through the streets of London the other morning. Inscribed in chalk on the back were the words: "Result of Careless Talk."

When the average man argues with a woman the final result is: "He came, he saw, he concurred."

If he still has his appendix and his tonsils, ten to one he is a doctor.

Tail Winds, published by flyers at Great Falls, defines a wolf as a guy who takes out a sweater girl and tries to pull the wool over her eyes.

One Siamese Twin to another: You must have had a swell time last night. I look like a wreck today.

He—You can follow your regular trade in the Navy.

Recruit—I am a cowboy.

He—Well you can ride the range in the galley.

"They tell me your wife is outspoken."

"By whom?"

Definition of safety pins: Legs that are so ugly they keep a girl out of trouble.

At the wedding, Sandy McTavish, the groom, looked so troubled that the best man was moved to inquire, "What's up Sandy? Hae ye lost the ring?"

"Nae."

"Then hae ye lost the railroad ticket?"

"Nae, mon, it's a muckle worse than that."

"Hoot, mon! What is it?"

"Ah hae lost ma enthusiasm!"

Henry: "My dear, I really don't believe you can ever teach that dog to obey you."

Mrs. Peck: "Nonsense, darling. Remember how obstinate you were when we were first married."

Alienist, to inmate of insane asylum: "How do you do sir. What is your name?"

Inmate: "My name? Why, King George, of course!"

Alienist: "But the last time I was here you were Theodore Roosevelt."

Inmate: "Yes, but that was by my first wife."

"We're having a party tonight, and won't you come along?"

"Oh, I can't. I'd love to but I haven't a thing to wear."

"That's all right; this is a blind date."

Blonde: "I am going on a picnic with a young sailor. What do you think I should take?"

Friend: "Care."

"How are you this morning?"

"All right."

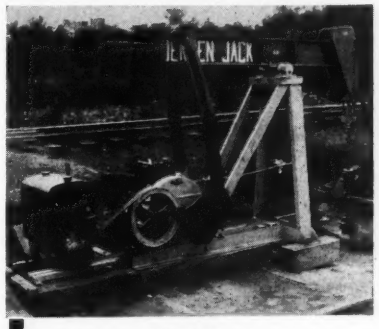
"Well, you ought to notify your face!"

Bill—What did you think of my argument?

Will—It was sound, in fact there was nothing but sound.

A drunk, watching a revolving door, saw a man walk in. Soon the revolving door revealed a pretty girl stepping out.

"It's a good trick," said the drunk, "but I still don't shee what that guy did with hish clothes."



You CAN . . . with a JENSEN!

You have heard of balancing a well—and you can do it with a JENSEN JACK. A combination of crank weights and beam weights make it easy to equalize the power required for the up stroke and the down stroke. This gives you smooth, quiet performance. Your equipment lasts longer and is naturally more dependable.

To the man who owns one there is no mystery about the popularity of JENSEN pumping Units.

California Representative

A. V. TURNER
445 W. 6th
Downey, Calif.
Phone: Topax 2-2410

Stocked by

THE OIL TOOL CORPORATION
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Phone 481-81

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BROTHERS MFG. CO.
Coffeyville, Kansas, U.S.A.

EXPORT OFFICE: 50 Church St., New York City

C. N. G. A. June Frolic

The California Natural Gasoline Association will hold its Annual June Frolic on Saturday, June 5, 1943 at Rio Hondo Golf Club, 607 Old River School Road, Downey, California, according to the joint announcement of William W. Robinson, Jr., association president and Ben C. Dumm, chairman of the entertainment committee.

The 1943 Frolic has been specially planned to consider the fact that many C.N.G.A. members are working a 48 hour week and accordingly the big time of the event will start with the buffet dinner at 6 o'clock in the evening and continue through the big 17 act show while a full sports program, carded for both the morning and afternoon, has been arranged for those whose schedules will permit participation.

Mindful of the fact that the nation is engaged in a war, the association debated whether or not to hold the Frolic this year. The decision to schedule the event was reached after careful deliberation. It was pointed out that many C.N.G.A. members are indoor workers and all have been working under extreme pressure. The recreation and relaxation afforded by an event of this kind can afford an opportunity for a release from pressure and a change of pace which will enable all to return to work refreshed and with renewed vigor for the tasks of the times.

Rio Hondo Golf Club was selected as the site for the 1943 Frolic because of its nearness to the principal Los Angeles basin oil fields and plants thus contributing to the saving of gasoline and rubber. Likewise, the club has all facilities for the sports program which has been arranged and the club has an atmosphere of informality tuned to the tenor of the Frolic.

The sports program includes golf, baseball, swimming, tennis, badminton, horseshoes, ping pong and volley ball. The custom of serving free beer to members and their guests during the day sports program will be observed.

W. W. Robinson, Jr.
(Announces June Frolic)

Rio Hondo Golf Club boasts a sporty 18 hole course capable of testing the skill of C.N.G.A.'s best. A green fee of $1.00, which will include locker and towel, will be charged and members may play 18, 36 or as many holes as desired for the payment of the $1.00 green fee. Clubs may be rented for 50 cents. Blind bogie prizes will be awarded. The first golfers will tee off at 7 a.m. Breakfast will be available for the early birds. Luncheon will likewise be served. Starting times must be reserved before May 29th and such reservations can be made by phoning Geo. Tyler, C.N.G.A. Secretary at Vandike 5521.

The annual baseball game this year will see a team made up from the oil companies pitted against a team made up from the supply houses. The game will be called promptly at 2 P.M. Those interested in playing on either team should write or phone Walt Bostrom, Meter Department, General Petroleum Corporation, Box M, Santa Fe Springs, Phone: Whittier 43850.

The courts of Downey High School, located nearby, have been secured for the use of those desiring to play tennis while the High School's pool will be available for swimming enthusiasts. Swimmers should bring their own suits and towels. A station wagon will leave the club house frequently to transport and return those desiring to participate in either of these events. Badminton courts, ping pong tables, horseshoe pits and a volley ball court will be available all day for those desiring to play.

A fine, outdoor buffet barbecue has been arranged and dinner will be served at 6 o'clock. This will be followed by the climax of the Frolic which is a 17 act stage show paced to the tempo of a laugh and a thrill a minute. Kenneth Harlan of motion picture fame who staged the Frolic show at Altadena last year returns to stage this year's event. With him will be that line of gorgeous Harlan Co-Eds who gave the association members such an eyeful last year. While the girls and the acts have always been the features of Frolic shows in past years, and they will be none-the-less this year, the big attraction of the evening will be Dick Lane who will be master of ceremonies. Those who attended the California Oil & Gas Association's Wild Cat party last year will remember how Lane panicked the show and they will want to hear him again, while those who had the misfortune of not hearing him will be exposed to the fastest line of sophisticated humor e v e r tossed around on any stage.

A record turnout is expected this year and those desiring tickets which are priced at $3.50 should communicate with George L. Tyler, C. N. G. A. Secretary, VAndike 5521. Assisting Ben C. Dumm, Allied Supply Company, chairman of the entertainment committee, are his committeemen including H. A. Dresser, The Fluor Corporation, Ltd., Lloyd Jones, The Cooper-Bessemer Co., Ray Todd, Pacific Lighting Corporation, and L. P. Sacre, Allied Supply Company.

TO HIT 'EM H-A-R-D-E-R

THE year 1943 promises to be the grimmest, hardest year this country has ever faced. Every effort, and every dollar of national income not absolutely needed for existence, should go into war work and War Bonds.

In the Pay Roll Savings Plan, America finds a potent weapon for the winning of the war—and one of the soundest guarantees of the preservation of the American way of life!

Today about 30,000,000 wage earners, in 175,000 plants, are buying War Bonds at the rate of nearly half a billion dollars a month. *Great as this sum is, it is not enough!* For the more dollars made available now, the fewer the lives laid down on the bloody roads to Berlin and Tokio!

You've undoubtedly got a Pay Roll Savings Plan in your own plant. But how long is it since you last checked up on its progress? *If it now shows only about 10% of the gross payroll going into War Bonds, it needs jacking up!*

This is a *continuing* effort—and it needs *continual* attention and *continual* stimulation to get fullest results.

You can well afford to give this matter your close personal attention! The actual case histories of thousands of plants prove that the successful working out of a Pay Roll Savings Plan gives labor and management a common interest that almost inevitably results in better mutual understanding and better labor relations.

Minor misunderstandings and wage disputes become fewer. Production usually increases, and company spirit soars. And it goes without saying that workers with substantial savings are usually far more satisfied and more dependable.

And one thing more, these War Bonds are not only going to help win the war, they are also going to do much to close the dangerous inflationary gap, and help prevent post-war depression. The time and effort *you* now put in in selling War Bonds and teaching your workers to save, rather than to spend, will be richly repaid many times over—now and when the war is won.

You've done your bit · Now do your best!

This space is a contribution to victory today and sound business tomorrow by **CALIFORNIA OIL WORLD**

BYRON B. NORRIS
(Returns to private consulting work)

Byron B. Norris has just announced a completion of his work with the Petroleum Section of the 9th Service Command, U. S. Army, and the opening of offices as consulting engineer.

In his letter to the editor Mr. Norris states: "For the past eight months I have served as Inspector in the Petroleum Section, Ninth Service Command, U. S. Army. Having completed that work, and at the request of some of my former clients, I have opened an office at 1009 Subway Terminal Building, 417 South Hill Street, Los Angeles, and am prepared to serve as an Engineer on matters concerning Petroleum, Mining or Water Supply work.

At present there is need for considerable more drilling of oil wells in California in order to assure our fighting forces in the Pacific that a sufficient supply of oil will be available. The Petroleum Administrator for War has urgently requested more drilling and especially of Exploration Wells. Coupled with that, recent orders with respect to material and equipment for oil field work have been issued which will facilitate future operations. For several years I have specialized on Geological Surveys and Reports for Exploration work and have a working knowledge of most of the prospective oil producing territory in California.

Also I am prepared to make Reports or Appraisals on Oil or Mining property or equipment and give Technical Supervision of Operations. Along the same line, I make Surveys and Reports for Water Development for Municipal, Industrial and Irrigation purposes. During past years, I have been called on to testify as an Expert or Technical witness in litigation involving oil property."

Wrather Now Director of Geological Survey

William Embry Wrather, one of the Nation's outstanding consulting petroleum geologists, was sworn in on May 7th as Director of the Geological Survey of the Department of the Interior at a ceremony in the office of Secretary of the Interior Harold L. Ickes. He succeeds Dr. Walter C. Mendenhall, who retired last February after 48 years of service in the Survey.

Following administering of the oath of office by Chief Clerk Floyd E. Dotson, Mr. Wrather received the congratulations of Secretary Ickes and more than a score of Bureau and Division chiefs and Department of Interior officials. He was confirmed for the position on May 3rd by the Senate. Previously Mr. Wrather's name had been proposed for nomination by a number of outstanding geologists and scientific organizations, including a committee of the National Academy of Sciences especially appointed for this purpose at the request of Secretary Ickes.

"I am confident that Mr. Wrather as its new director will add to the outstanding contributions that the Geological Survey has made in its long years of public service," said Secretary Ickes. "It was my conviction that the selection of a director of this important scientific agency should not have a political consideration. I therefore requested the National Academy of Sciences to propose for the post the names of men who had high administrative ability as well as sound technical and scientific competence. Mr. Wrather was number one on the list provided by that body."

Mr. Wrather was born at Brandenburg, Kentucky in 1883. He received his bachelor's degree at the University of Chicago in 1907 and studied at the Graduate School of that institution for two additional years. He was instructor in geology at the University of Chicago in 1922; University of Texas, 1927; Yale University in 1930; Northwestern University in 1931; and Southern Methodist University in 1935.

Mr. Wrather represented the National Academy of Sciences and the National Research Council at the International Congress at Madrid in 1926. He attended the National Geological Congress in South Africa in 1929. He was a member of the Organization Committee of the 16th International Geological Congress in Washington in 1933 and was a delegate to the 17th International Geological Congress at Moscow, Russia, in 1937. For notable work in geology, he was awarded the alumni medal at the 50th anniversary of the University of Chicago.

The new director of the Geological Survey is a Fellow of the Geological Society of America, in which he has held several offices; a member of the American Association for the Advancement of Science, of which he is a member of the Executive Committee; a former president of the American Association of Petroleum Geologists; a former president of the Society of Economic Geologists; a former president of the Texas Geological Society; and a member of the American Institute of Mining and Metallurgical Engineers, of which he was chairman of the Petroleum Division in 1933.

Mr. Wrather's professional work has been largely in the field of petroleum geology, but he is recognized as one having wide understanding and appreciation of the entire field of geology. He formerly served as Associate Chief of the Metals and Minerals Division of the Board of Economic Warfare. Mr. Wrather was married in 1910 and has two children.

Field Development

Los Angeles Basin

Newport Beach Work Continues

D. W. Elliott Townsend Land Co. No. 1, which pumped 38 bbls. of 14 gravity clean oil from 2366 ft. after bottoming in sand, was deepened to 2424 ft., plugged to 2408 ft., and is bailing after sanding up on the pump.

On an adjacent site Signal Oil & Gas Co., which is interested in the discovery well, is preparing to drill Willow Comm. No. 1. This test will be located approximately 125 ft. north and 400 ft. west of the intersection of the west bank of the Santa Ana River and the north line of the Coast Hiway in sec. 19-6s-10w.

Ramsey Project Now Under Way

W. E. Ramsey's long projected wildcat in the Chatsworth area of Los Angeles county is under way with rig up and the drilling contract let. Operating under the name Anderson-Pritchard Oil Corp., Anderson-Pritchard-Ramsey No. 1, the test is reported scheduled to go to 5000 ft. in the southwest quarter of sec. 24-2n-17w in search of production indicated by the Chatsworth Reservoir oil seepages.

Good Completion In Redondo Sector

Thos. W. Simmons Regent No. 1, in the Redondo section of the Torrance field, was redrilled and deepened to 3592 ft. and completed from 300 ft. of zone pumping 135 bbls. of 14.9 gravity oil per day. The operator is reported planning a grass root job nearer the hills.

In the same field area Royal Pet. Co. is recompleting Carson No. 5 after redrilling and deepening to 3447 ft. while rigging up for a similar job on No. 6. Other work is carried on with LeBow-McNee drilling the first of three wells on the Dominguez Estates at 300 ft. while Wood-Callahan Oil Co. is preparing to start the first of two wells on their portion of the estate acreage.

West Coyote Well Flows Solid Rate

Standard Oil Co. effected another of its good West Coyote completions when Murphy-Coyote No. 132 came in from 6115 ft. flowing an initial 972 bbls. per day. Settled production through an 18/64 in. bean was 488 bbls. of clean 31.8 gravity oil and 308,000 cu. ft. of gas.

Gen. Pet. To Drill Rice Canyon Test

General Petroleum Corp. is preparing to drill Mendota No. 1 as a test along the Pico Anticline. Located in the northeast quarter of sec. 22-3n-16w the wildcat lies approximately a half mile southeast of the Rice Canyon field and a little more than a mile northeast of the Aliso Canyon field. Two shallow tests were drilled nearby in the early days of development but by no means constitute a trial of the area in the light of present day drilling methods.

Union To Start Rosecrans Well

Union Oil Co. staked location for Amestoy No. 1 near 135th and Hoover Streets northwest of the Rosecrans field. The well will test the O'Dea Zone in this outpost lo-

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Aliso Canyon	Standard Oil Co., Frew	1-1	29, 3-16		Grading roads
Del Valle	Standard Oil Co., N.L. & F.	3-1	19, 4-17		Location
Las Llajas	Western Gulf Oil Co., Brady	1	13, 3-17	9610	Drilling
L. A. City	Shell Oil Co., Inc., Verne Comm.	1	24, 1-13	7924	Abandoned
Montebello	Cont. Oil Co., Baldwin	1	3, 2-11		Grading
Puente	Barry Oil Co., Inc., Rowland	1	14, 2-10	2423	Idle
	Melvin Hansen, Dragna	1	24, 2-10	3222	Idle
	Lomi Oil Corp., John Rowland	1	14, 2-10	130	Drilling
Rice Canyon	General Pet. Corp., Mendota	1	22, 3-16		Roads
Rosecrans	Union Oil Co., Amestoy	1	18, 3-13		Location
Temescal	The Texas Co., Dominguez	57-1	1, 4-18		Rigging up
Whtitier-La Habra	H. & C. Oil Co., Joyce	1	22, 2-11	5640	Drilling
	Los Nietos Valley O. Co., Woodward	1	29, 2-11	3600	Prep. to resume
	Orange County				
Costa Mesa	Carrey, A. A., Meyer	1	16, 6-10	1717	Abandoned
Newport Beach	D. W. Elliott, Townsend	1	20, 6-10	2424	Bailing
	Signal O. & G. Co., Willow Comm.	1	19, 6-10		Location
	San Bernardino County				
Carbon Canyon	Veta Grande Dev. Co., McDermott	2	5, 3-8	1184	Idle
Colton	Supreme Oil Co., Well	1	2, 2-4	940	Idle

cation. Production has been effected north of this site but if found here it will become the most westerly completion in the field.

Basin Oil To Make Potrero Deep Try

Basin Oil Co. is preparing to make a 9000 ft. test in the Potrero field near Inglewood. The well, Potrero No. 14, is located adjacent to production found in many Pliocene-Miocene zones from approximately 3600 to 6500 ft. One earlier driller, Potrero No. 2, was carried to 9923 ft. at the northwesterly edge of the Country Club pool and was finished at plugged depth of 5936 ft. for small production on gas lift.

Havenstrite Making Del Valle Deep Test

R. E. Havenstrite, Opr. is deepening Liebhart No. 1 on sec. 15-4n-17w in the easterly field pool. Previously completed in the intervals 7011-7043 and 7070-7096 ft., the well will try for saturation in the deep or Bering zone which the company's Barnes No. 2 found productive after drilling to 9875 ft.

C.N.G.A. meets regularly the first Thursday of each month at Rio Hondo Golf Club, 607 North Old River School Road, Downey. Dinner at 6 P.M., meeting at 7:30 P.M. Meetings open to all those interested.

General Refractories Purchase Refractories Corp.

The General Refractories Company of Philadelphia, Pennsylvania, has just announced the purchase of the assets of the Refractories Corporation of Los Angeles, California. The Refractories Corporation is one of the leading manufacturers of refractories on the West Coast.

The recent phenomenal growth of the iron and steel industry here has greatly increased the demand for refractories to construct and repair blast furnaces, open hearth furnaces, and other equipment used in steel manufacture. Other West Coast industries producing aluminum, magnesium, copper, portland cement, glass, chemicals and petroleum products are also large consumers of refractories.

The new owners will operate the plant for the production of fireclay brick, silica, sillimanite, glass-house refractories and specialties. The plant will also be used as a warehouse and distributing center for other General Refractories products not produced at the Los Angeles Plant.

Mr. Fred C. Sammons, formerly vice president of Refractories Corporation, will continue with the General Refractories Company as Western Manager with offices at 3363 Fruitland Road, Los Angeles, California.

The General Refractories Company of Philadelphia, Pennsylvania, is the second largest manufacturer of refractories in the world. It is now operating 22 manufacturing plants and numerous mines for the production of ganister, fireclay, diaspore, kaolin and other refactory materials. Its operations are located in the states of Pennsylvania, Maryland, Ohio, Kentucky, Illinois, Missouri, Alabama, Texas, Wisconsin and now California. Its products are used in every state in the Union as well as Canada, Mexico and all the countries of Central and South America. Previous to the present World War the General Refractories Company was a large exporter to Europe as well as South Africa and the Far East.

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OIL AND GAS LEASE

United States Department of Agriculture Farm Security Administration, San Francisco, California, May 1, 1943. Sealed bids in triplicate will be received until 11:30 A. M., June 15, 1943, and then publicly opened, offering bonus for operating rights in connection with gas and oil leases on land located at Thornton, County of San Joaquin, State of California, containing an area of 250 acres more or less. Award of lease will be made only to bidder who can show sufficient experience and financial resources and prove citizenship. Interested parties may obtain bid documents, lease forms, and operating regulations from Regional Business Manager, Farm Security Administration, 30 Van Ness Avenue, San Francisco, California.

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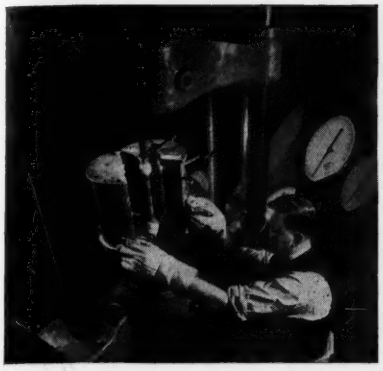

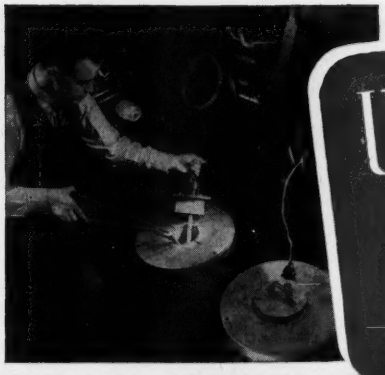

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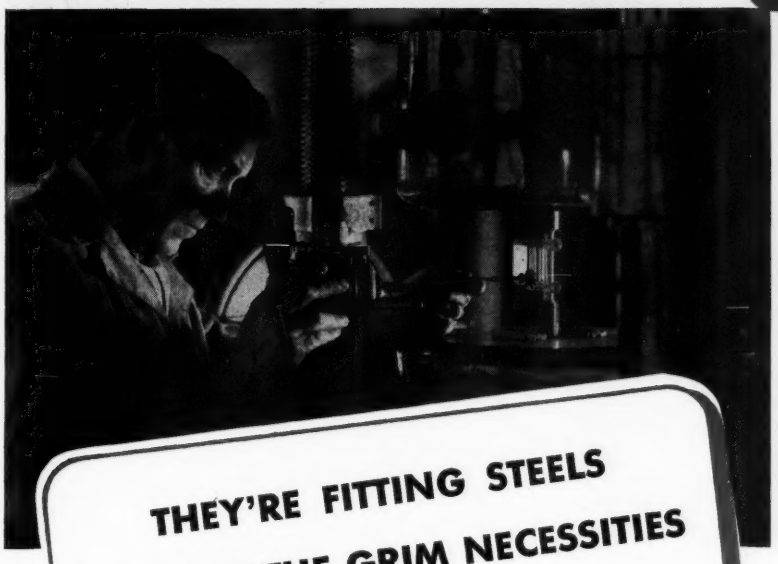

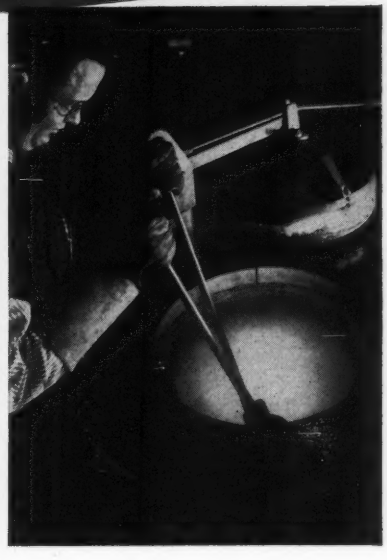

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IT is to help *you* speed the war program that the lights are burning late in our steel production and research laboratories.

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Their knowledge and experience contributed to the development of the National Emergency Steels that have made it possible to meet the critical conditions imposed by the shortages of nickel, chromium, molybdenum, vanadium and other strategic alloys.

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UNITED STATES STEEL

Coastal District

Foxen Canyon "Cat" Redrilling

General Pet. Corp. Wickenden No. 2 on sec. 24-8n-32w, off the southeasterly tip of the Gato Ridge field, is redrilling to the north for another look at the section after bottoming the straight hole in fractured shale with steep dips at 5189 ft. The well seeks production along the same uplift from which the Gato Ridge and Cat Canyon fields produce.

Circulation Bad At Purisima Hills

Whittier Associates is having circulation trouble in Barham No. 1 on sec. 11-7n-32w. Located on the Barham Ranch on the northern flank of the East Purisima Hills some four miles southeast of Los Alamos, the well was last reported at 1008 ft. after cementing 11¾ in. surface pipe at 523 ft.

Los Olivos Well Gets Fair Average

Tide Water Assoc. Oil Co.'s second well in the Los Olivos area, Chamberlain No. 1 on sec. 38-8n-31w, which bottomed at 5194 ft. is producing by distillate injection. The last ten days production has averaged 186 bbls. of 10.2 to 12.5 gravity oil-including distillate, since formation oil is extremely heavy—with the cut hovering at 17.0%.

Next to start here will be Hub Oil Co.'s La Laguna No. 1 which is building rig on sec. 7-7n-30w.

Santa Maria Activity Soon to Commence

Activity in the Santa Maria field, where Union Oil Co. has been consistently working a development program, will soon be augmented by several additional strings. R. R. Bush Oil Co. plans a program of considerable size while several smaller operators have signified an intention to work in the field.

Already at work is Brain & Kohler which has let the drilling contract and is grading site for Rembush No. 3 on sec. 35-10-34w at the southerly field flank. Besides Union, which has two strings busy, the only other currently active operator is Bel-Air Oil Co. which is preparing to run a combination string of 7 in. to bottom at 5420 ft. on sec. 35-10n-34w.

Piru Well Abandoned

Tide Water Assoc. Oil Co. abandoned it's second Hidden well on sec. 5-4n-18w in hard gray sand and shale at 8248 ft. after drilling thru a Miocene fault into younger beds.

On section 14 of the township Continental Oil Co. Holser No. 2 drills ahead in hard cherty shale showing steep dips at 7196 ft. On section 4 Pacific Western Oil Corp.'s "No dope" Temescal No. 14 is making hole at 5860 ft.

Delroy Pet. Corp. Lisk No. 3 on sec. 22-5n-18w, recovered small amounts of 25 gravity oil on test of the intervals 2652-95 ft. and 2705-50 ft. and is reported preparing to deepen from present depth of 2805 ft.

Shiells Canyon Well To Deepen

Seaboard Oil Co. is rigging to deepen Seaboard-Calumet No. 1 approximately 100 ft. to take in the entire Elkins zone. Located on sec. 10-3n-19w the well was completed at 3292 ft. for approximately 100 bbls. of 34 gravity oil.

Ventura Ave. Yet Active

Work in the Ventura Avenue field remains generally active with several projects working and many more immediately scheduled. Shell Oil Co., is running two strings, Tide Water Assoc. Oil Co. a like number while General Pet. Corp. also operates a duo in the field. British-American Oil Prod. Co. and Lloyd Corp., Ltd. are each operating one outfit while Alliance Pet. Corp. has worked

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
	Santa Barbara County				
Gato Ridge	General Pet. Corp., Wickenden	2	24, 8-32	5189	Redrilling
Lompoc	Alphonzo E. Bell Corp., Lompoc	7	28, 8-34		Location
	Fickert Oil Corp., Ltd., Well	1	8, 7-33		Rig
Los Olivos	Hub Oil Co., La Laguna	1	7, 7-30		Bldg. rig
Purisima Hills	Whittier Assoc., Barham	1	11, 7-32	1008	Drilling
	Ventura County				
Bardsdale	San Marino Oil Co., Elkins	1	7, 3-19		Rig
Conejo	L. A. Basin Oil Co., Well	1	4, 1-20	1746	Testing
	Sycamore Oil Co., Boylan	1	23, 1-20	2747	Idle
Eureka Canyon	El. Rika Oil Co., Well	4	33, 4-18	351	Drilling
Fillmore	Standard O. Co., Fillmore Comm.	2-1	24, 4-20		Grade
Oxnard	E. F. Delaney Todd	1	6, 1-21		Location
Piru	Continental Oil Co., Holser	2	14, 4-18	7196	Drilling
	Delroy Pet. Corp., Lisk	3	22, 5-18	2808	Prep. to deepen
	Pac. West. O. Corp., Temescal	14	4, 4-18	5860	Drilling
	Standard Oil Co., Crestmont	1	14, 4-18		Foundation
	T.W.A. Oil Co., Hidden	2	5, 4-18	8248	Abandoned
Rincon	Shell Oil Co., Inc., Tomson	1	8, 3-24	8888	Drilling
Sespe	McCaslin, W. E., Burson	1	19, 4-19	2039	Idle
	Volunteer Pet. Co., Tar Creek	3	28, 5-19	710	Drilling
South Mt.	F. E. Fairfield, S. M.	1	19, 3-20	2750	Rigging up
Timber Canyon	A. T. Dennison, Well	1	13, 4-21	2202	Bailing
	Crude Oils, Inc., West	1	19, 4-20	958	Idle
	Fletcher & Babcock, O'Leary	1	29, 4-20		Location

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Colusa	Shell Oil Co., Inc., Buttes Comm.	1	2, 15n-1e		Location
Monterey	Columbia Oil Co., Vierra	1	7, 13s-2e		Rig
Sacramento	Amerada Pet. Corp., Capital Co.	1	36, 5n-5e	6675	Drilling
	Jergins Oil Co., McCormack	1	30, 5n-5e		Rigging up
	Richfield Oil Corp., Natomas	2	28, 10n-4e	3252	Drilling
San Joaquin	Amerada Pet. Corp., Lodi Com.	10-1	10, 4n-7e		Grading
	Bankline Oil Co., Comm.	2-1	12, 4n-6e	5537	Drilling
	Bankline Oil Co., Comm.	3-1	4, 4n-7e	3638	Abandoned
Solano	Amerada Pet. Corp., Starkey Fee	1	2, 6n-2e	9434	Idle
	Standard Oil Co., Honker Comm.	1A	25, 3n-1w		Rig
Tehama	The Texas Co., Walbridge	1A	32, 28n-2w		Rigging up

over Hisey No. 4 which was last reported on stream for an estimated 300 bbls. of clean 31 plus gravity oil and 310,000 cu. ft. of gas thru a 13/64 in. bean.

North Counties Wells to Start

Two new wildcats are scheduled in the northern end of the state. First to get under way will be Amerada Pet. Corp.'s Community No. 10-1 which proposes to seek Lodi area gas production on sec. 10-4n-7e while the other, Shell Oil Co., Inc.'s Buttes Community No. 1, will put down on sec. 2-15n-le in the Marysville area of Colusa county.

In Sacramento county Richfield Oil Corp.'s Natomas No. 2 on sec. 28-10n-4e is spot coring undisclosed formation at 3252 ft. while Amerada Pet. Corp.'s Capital Co. No. 1, sec. 36-5n-5e, is drilling at 6675 ft. without having reported showings. In the same area Jergins Oil Co. McCormack No. 1, section 30 of the township, drilled to 300 ft. losing circulation all the way. Owing to water sands at the surface the foundation and derrick legs are settling which may necessitate skidding the rig for another start unless it is decided to move in a light mast to finish the job.

Still working the Lodi area is Bankline Oil Co. with Community No. 2-1 on sec. 12-4n-6e drilling at 5537 ft. after abandoning No. 3-1 on sec. 4-4n-7e at 3639 ft. without finding adequate sands.

In the Tuscan Springs area of Tehama county The Texas Co. is preparing to carry on in Walbridge No. 1A on sec. 32-28n-2w. Bottomed at 1498 ft. this well was suspended because of trouble with high flowing water heads.

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San Joaquin Valley

Superior Gets Oil on Trial

Superior Oil Co. Kreyenhagen No. 81-22 in the Wheatville area indicated potential productive properties when a formation test at redrilled depth of 6860 ft. recovered 18 stands of clean light gravity oil. At last report 7 5/8 in. casing was standing cemented on bottom for gun perforating opposite the Miocene oil sands.

Located on sec. 22-17s-18e, the well is situated midway and slightly southwest of a line drawn between the Helm and Riverdale fields of Fresno county. Originally bottomed in barren formations of unspecified age the test redrilled the upper sectin of the potential zones to recore sections missed in the first hole.

Guijarral Drillers Delineating Structure

Current drilling in the Guijarral Hills is beginning to define a general north south shore line structure upon which Standard Oil Co.'s Pleasant Valley No. 89-29F discovered Eocene production. Located in the northeast corner of sec. 29 20s-16e a little more than a mile southeast of Coalinga Eocene production, the well flowed an initial 819 bbls. of 28.5 gravity oil and 500,000 cu ft. of gas thru a 36/64 in. bean from 172 ft. of Eocene sands above the Siltstone at 9141 ft.

A quarter of a mile to the west the company's P. V. No. 62-29F is preparing to test grayish Eocene sands in the interval 8945-9055 ft. after finding the Siltstone about a hundred feet higher than in the discovery well. A like distance north of discovery, in the southeast corner of section 20 of the township, R. S. Lytle's well No. 88-20F is coring a tight oil sand zone at 8998 ft. after topping the pay some 130 ft. higher than the original well. One location northeast of the first well, Standard's third well in the area, P. V. No. 28-21F in the southwest corner of sec. 21, is drilling in hard Kreyenhagen shale at 7744 ft. with the top reported structurally higher than the correlation hole.

Comanche Pt. Well Runs Pipe for Trial

V & C Oil Co. is preparing to set casing in Bigelow No. 1 to test showings reported as fair to good in the interval 1785 to 1884 ft. The well, located in sec. 1-31s-29e, was bottomed in very hard formation at 2053 ft.

On sec. 34-12n-18w L. E. Ellington is rigging up to resume drilling the T. W. Burnham Chiquita No. 2 from present depth of 1972 ft.

Tide Water Finishes 2nd East Strand Well

Tide Water Assoc. Oil Co. finished it's second East Strand well, KCL No.76-8, one location east of No. 56-8 which discovered the new pool near the center of sec. 8-30s-26e a mile east of the old field. Production was 128 bbls. of clean 32.1 gravity oil and 225,000 cu. ft. of gas thru a 2/16 in. bean from 8215 ft. No open test was made as was the case in the discovery well which flowed 1800 bbls. and 850,000 cu. ft. of gas from substantially the same open interval.

In the original Strand field the company is rigging up to deepen its KCL No. E-46-7 from 8374 ft. This well is the most easterly of the field wells and encountered some geologic disturbances as yet not completely explained.

Lake Job Abandoned

Shell Oil Co., Inc. abandoned its over-the-water T. S. G. No. 28-22- on Tulare Lake in Kings county. Drilled from an island several miles from shore, the test bottomed in silty brown Eocene shale at 12,491 ft. without having encountered saturated sands.

Antelope Hills Well To Test

E. B. Hall & Co. is preparing to test oil showings from 750 ft. to 910 ft. in its Theta No. 17-56. Located on sec. 17-28s-20e, southeast of the Antelope Hills field, the well bottomed in shale at 1833 ft. and plugged to 910 ft. to run casing for trial.

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Chowchilla	Pure Oil Co., Gamboni	1	28, 10-13	5675	Drilling
Huron	G. P.-Pure Oil Co., Sopac	81-9	9, 17-17		Bldg. rig
Guijarral Hills	Standard Oil Co., Well	62-29F	29, 20-16	9055	Testing
	Standard Oil Co.,	28-21F	21, 20-16	7744	Drilling
	R. S. Lytle, Well	88-20F	20, 20-16	8998	Drilling
Raisin City	Seaboard Oil Corp., S.T.U.	53-14	14, 15-17		Roads
Wheatville	Superior Oil Co., Kreyenhagen	81-22	22, 17-18	9565	Testing
	Kern County				
Antelope Hills	E. B. Hall Co., Theta	17-56	17, 28-20	1833	Testing
Bowerbank	Albert Stevenson, Bowerbank	1	5, 29-24		Location
Comanche Point	T. W. Burnham, Chiquita	2	34, 12-19	1972	Prep. to deepen
Cymric	Los Nietos Co., Sheep Springs	1	20, 29-21	5277	Abandoned
	Honolulu O. Corp., Fitzgerald	32A-26	26, 29-21	3315	Drilling
Dyer Creek	D. D. Dunlap, Dyer Creek	1	11, 26-27	2294	Bailing
Devils Den	Etienne Lang, Occidental	3-SW-29	29, 26-19		Rig
Elk Hills	Pac. West'n & G.F. Getty, McNeil	1	22, 30-24		Location
Kern River	O. H. Calhoun, Bridge	1	17, 28-28		Location
	R. M. Kiesau, Opr., Kiesau	1	24, 28-28		Location
McKittrick	Haddock, T. J. & J. E., Akern	1	24, 29-20	920	Drilling
McVan	Jergins Oil Co., Lambert	1	35, 26-27	3240	Abandoned
	Pac. Western Oil Corp., Enas Fee	6	21, 27-27	2096	Testing
Mt. View	DiGiorgio Fruit Corp., Well	4	10, 31-29	5850	Abandoned
Round Mt.	Harp & Brown, Olcese	1	17, 28-29		Rigged up
	Palomar Ref. Co., Russell	1	6, 28-29		Rigged up
	Signal Pet. Co. of Calif., McGregor	1	26, 28-28	1915	Drilling
Strand	T.W.A.O. Co., KCL	76-8	8, 30-26	8370	Completed
	Kings County				
Hanford	The Texas Co., Souza	14-33	33, 17-22		Cellar
McLure Valley	T.W.A.O. Co., Orchard	56-1	30, 24-18	1890	Drilling
Tulare Lake	Shell Oil Co., Inc., T.S.G.	21-28	28, 22-20	12491	Abandoned
	Madera County				
Mendota	The Texas Co., Gill	14-16	16, 13-16	5760	Drilling

Texaco Gill Hits Gray Sand

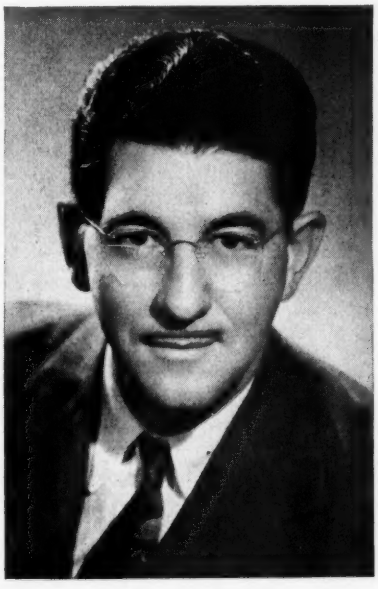
The Texas Co.'s second Mendota area well, Gill No. 14-16 on sec. 16-13s-16e, was last reported in gray sand at 5760 ft. after finding the 38-16 sand equivalent gray with oil spots at 4605 ft. The well however already demonstrated good gas capacity by flowing 10,600,000 cu. ft. rate on test of the interval 4482-4501 ft.

New Riverdale Well Completed

Amerada Pet. Corp. finished another good well on sec. 15-17s-19e in the Riverdale field of Fresno county when Mathias No. 38-15 bottomed at 6900 ft. to complete from the interval 6805-15 ft. flowing under wraps. The first gauge was 299 bbls. of 37.4 gravity oil and 158,000 cu. ft. of gas in 13 hours thru a 9/64 in. bean.

Frank Bergeron Appointed California Sales Manager for Baash-Ross

Announcement has recently been made of the appointment of Frank E. Bergeron as California Sales Manager for the Baash-Ross Tool Company, succeeding Mr. B. Bronzan, who is now devoting his full time to general managership of the organization.



Frank Bergeron

Mr. Bergeron, by reason of his widespread knowledge of the industry, is well qualified for his new post. After graduating from UCLA he accumulated three years mining experience before coming with the Baash-Ross organiaztion in 1935. After several years in the shop, gaining experience in the design and operation of the Baash-Ross products, he went into sales office work, followed by a four-year period as Field Sales Representative. In his new capacity he has charge of oil tool sales for the California division of the Baash-Ross company.

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Administrative Highlights

(Continued from Page 6)

may be used on delivery orders without further submission to PAW.

The manufacturers and suppliers of tubular goods will know that the advance orders on their books from the large U. S. operators will represent on an average, just one half of the total U. S. requirements. They will arrange their production scheduling and inventories accordingly.

To obtain Non-Controlled Materials, all production operators must submit copies of delivery orders for $100 or more to either PAW District Office or the Oil Controller, showing the serial number assigned on Form PD-873 and the use to which the material is to be put. If any single item is $500 or more, or the total is $1,000 or more, approval must be obtained prior to placing the order. If no single item is $500 or more and total is less than $1,000, approval is not required and copy of delivery order is filed for information purposes only.

The method of securing both controlled and non-controlled materials for construction for marketing, natural gasoline, refining or transportation projects is set forth clearly in tabular form in Schedule "E" of the order and in all cases required the use of Form PD 200 to obtain priorities assistance.

Materials for maintenance, repair and operating supplies (MRO) for all branches of the petroleum industry may be secured by the use of a preference rating of AA-1 and an allotment symbol MRO-P98-b, subject to the following conditions:

1. Aluminum for MRO may not be obtained in amounts exceeding one hundred pounds per calendar year, except by special allotment from the Aluminum and Magnesium Division of the War Production Board in Washington.

2. When the cost of any single item is $500 or more, prior submission of the delivery order to Washington PAW Office or Canadian Controller for approval is required for all branches except domestic production. For domestic production purposes, such orders must be submitted to the District PAW Office for approval.

3. When the total cost of all items is $1,000 or more, but no single item is $500 or more, prior submission of the delivery order to the District PAW Office or the Controller for approval is required.

4. When the total cost of all items is less than $1,000, but more than $100, with no single item of $500 or more, copy of delivery order, for information only, must be submitted to the PAW District Office or to the Controller. Approval is not required, unless steel valves, cast iron valves over twelve inches or industrial control instruments are involved. In such cases the special provisions of Schedule "D" of the order apply.

5. Emergencies involving actual breakdown or suspension of operations will be handled by telephone, telegram or letter to the PAW Washington Office, furnishing certain information indicated in the order.

There are four general provisions in the order that apply to production, construction and MRO operations alike:

1. Petroleum operators are not subject to the provisions of CMP Regulations Nos. 2, 5 and 6, or paragraphs (i), (s), (s-1) and (u) of CMP Regulations No. 1; nor shall provisions of WPB Limitation Order L-41 apply to operators under P-98-b.

2. An operator in the case of production or construction projects, may if necessary, allocate a part of his controlled materials allotment to a Class "A" controlled material product manufacturer, or to a contractor (each of whom then becomes a secondary consumer) for reallotment or the placement of controlled material orders.

3. Any delivery order placed in accordance with the terms of P-98-b shall constitute an authorized controlled material order and shall be rated and have the same status as though placed under CMP Regulation No. 3.

4. Paragraphs (L) gives one form of certification which may be used on all delivery orders, instead of the variety of such forms required under CMP Regulations.

There are six schedules, "A" to "F" attached to the amended order.

"A"—defines maintenance and repair.

"B"—defines uses which cannot be classified as petroleum industry use.

"C"—lists materials used in the industry which are excluded from the terms of P-38-b, except under specifically defined circumstances.

"D"—lists specific materials, which when ordered for MRO purposes, require handling differing slightly from the general MRO provisions.

"E"—lists in tabular form the requirements for construction projects.

"F"—defines the boundaries of the PAW Districts and gives the mailing address of each District Office.

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